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PROTECTING ANTARCTICA'S ENVIRONMENT

HEARING

BEFORE THE

SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND
SPACE

OF THE

COMMITTEE ON COMMERCE,
SCIENCE, AND TRANSPORTATION
UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

PROTECTING ANTARCTICA'S ENVIRONMENT

SEPTEMBER 8, 1989

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PROTECTING ANTARCTICA'S ENVIRONMENT

FRIDAY, SEPTEMBER 8, 1989

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE,
Washington, DC.

The Subcommittee met, pursuant to notice, at 9:35 a.m. in room SR-253, Russell Senate Office Building, Hon. Albert Gore, Jr. (chairman of the subcommittee), presiding.

Staff members assigned to this hearing: Mike Nelson, professional staff member and Fiona Branton, minority staff counsel.

OPENING STATEMENT BY SENATOR GORE

Senator GORE. Good morning. Thank you for coming and attending today. In this hearing we are going to examine what ought to be done to protect Antarctica's environment. More and more people are going to Antarctica to work, to visit, to do research, and their activities are beginning to affect an incredibly fragile environment.

Years ago, the only people in the Antarctic were a few hundred researchers from the United States, the UK, the Soviet Union and a small number of other countries. Today, there are dozens of research bases in Antarctica, thousands of people; and even smaller countries like Uruguay and Poland are getting involved, along with the superpowers.

Antarctica is no longer just for researchers either. More than 1,000 tourists cruised to Antarctica last year, and everyone predicts that number will increase rapidly, as more and more people want the chance to see this vast, almost untouched continent.

This increased activity is both good news and bad news. Of course, the bad news is that more people usually means more damage to the environment, and the Antarctic environment is perhaps the most fragile on Earth. The good news is that as more people visit, more attention will be paid to the need to protect Antarctica, and the more pressure there will be to take good care of this very special place.

Last year I was fortunate enough to join Chairman Hollings on a visit to Antarctica. It is not easy to get there. After you get all the way around to the other side of the world, to New Zealand, it is another eight hours due south by plane to the main U.S. base at McMurdo; then another three hours by plane from there to reach the pole.

Flying across the continent, one quickly realizes how vast and empty it is: as big as the United States and Mexico combined, and

yet, on the entire continent, there are fewer than 1,000 year-round inhabitants; 97 percent is covered by thousands of feet of ice, and most of it is virtually devoid of any life of any kind.

In contrast, of course, the waters around Antarctica have the richest concentration of life you can find practically anywhere on the planet: fish, seals, whales; the smaller animals they feed on; clustered along a thin strip of coastline, millions of penguins and other sea birds. And the ecosystems involved are extremely fragile. It is into those ecosystems that man is intruding.

Of course, humans like the penguins and seals, are concentrated mostly along the coast. Clearly, the research bases and tour boats which operate there must, as a result, coexist with the environment and make special efforts to protect it.

The members of this subcommittee and full committee have a particular interest in Antarctica, of course, because we oversee the National Science Foundation, which runs the U.S. Antarctic Program. Also, NSF operates McMurdo Station, the largest base in Antarctica, and smaller bases at Palmer Station and the South Pole, not to mention the many more temporary research camps that are set up throughout the continent.

The U.S. Antarctic Program is providing critically needed answers to questions about global change, among other research objectives. Research on the ozone hole and the ice cores, which record tens of thousands of years of the Earth's climatic history, allow scientists to document the damage that man is doing to our planet and improve our predictions of what might be in store for the future.

In many ways, Antarctica is providing critical missing pieces to the puzzle of global change.

As I mentioned a moment ago, I went to Antarctica last November, along with Chairman Hollings, to see what the researchers were finding. I also went to investigate some of the environmental problems, principally at McMurdo, that had been the subject of some discussion prior to the visit.

I spent a good deal of time, and Dr. Wilkniss, who is one of our witnesses, was kind enough to lay it all out and instruct all of our people there to be totally candid about what the problems are and how they got that way and what we can do to solve them.

I saw some very large and ugly piles of rusting scrap metal and trash still being burned in a large, open pit adjacent to the base; raw sewage being dumped directly into the McMurdo Sound—diluted, but untreated in any other way. Of course, the area contaminated is tiny compared to the vastness of the continent, and is minor compared to what one can find in most any American port city, still, the Antarctic ecosystem is so fragile that we can and should do much more to minimize the pollution, to prevent the pollution American researchers are causing.

And the NSF agrees. They have proposed a five-year, \$179 million safety, environment and health initiative to accelerate their efforts to fix many of the environmental problems at the NSF bases.

I strongly support this initiative. And I want to note that in the past, NSF has taken action to address the environmental problems at McMurdo and elsewhere, but has not found the funding in the budget to do the job correctly.

The budget for the U.S. Antarctic Program has been roughly constant in real dollars for several years. And, as a result, in the past, whenever more was spent on pollution control, that meant cutting NSF's Antarctic Research Program. Obviously, we have come to a point when we simply cannot afford to cut the budget funding research on the ozone hole and global change. And that is why this new initiative is so important and why the new resources it represents are critical.

With this initiative, NSF will be able to do the job right and to continue critical research on global pollution, while it takes care of the pollution that NSF itself has helped to cause.

Today's hearing will also provide a chance to consider problems being caused by other nations in Antarctica. Last January, of course, the *Bahia Paraiso*, is an Argentine freighter, supplying an Argentine research base, ran aground spilling hundreds of thousands of gallons of fuel and spoiling shorelines for miles.

Unfortunately, there were no emergency plans to deal with such a spill. Just as in Valdez, in the Alaskan spill, it took way too long to start the clean-up. And the Argentines did very little. Luckily, American ships were able to rescue the passengers, and NSF has spent millions to minimize the damage. It was obvious beforehand, and is abundantly clear now, that a more coordinated international effort is needed to prepare for such accidents.

There recently has been action on several fronts on the international scene to protect Antarctica. And next month in Paris, the Antarctic Treaty nations will consider stricter environmental protection measures, including new regulations on waste disposal. Such international measures are clearly needed. The U.S. can clean up the NSF bases, but other nations must clean up their act as well.

In addition, of course, last year the Antarctic Treaty nations finished negotiations on the Antarctic Minerals Convention. In the next few weeks, the Administration is expected to submit the Antarctic Minerals Convention to the Senate for consideration. The Convention would set up a framework to regulate any mining activity in Antarctica. It contains strict provisions to prevent mining from ruining the Antarctic environment.

In the coming months, the Senate will have to decide whether or not these measures go far enough.

Today, in addition to discussing the other questions I have mentioned, I want to begin looking at some of the environmental issues involved in the Minerals Convention, although, clearly, this will not be the last hearing the Senate conducts on this topic; it will be the object of a great deal of discussion and debate.

We have an opportunity to make Antarctica a model for global environmental protection. Antarctica and the surrounding oceans cover 10 percent of the world's surface and remain almost as untouched as they were when they were first explored in the last century.

On the other continents, man's carelessness has led to deforestation, air and water pollution, soil erosion and desertification. In the Antarctic, we have a chance to improve our record; to live with the environment without ruining it. But this requires international cooperation. The Antarctic Treaty system provides a good frame-

work for such cooperation, and the U.S. can help by setting a good example for the rest of the world to follow.

The NSF initiative will help to set that example.

I hope, as well, that Antarctica will provide a testing ground for developing the kind of international agreements we will need to address environmental problems worldwide. Because there are many other much larger, more complicated global problems, like global warming and ozone depletion, that simply cannot be addressed without international action and cooperation of an unprecedented character.

Just as Antarctica may be the key to our understanding of global change, it could also prove to be the key to the policies needed to address the problem.

I want to recognize our ranking Republican member, Senator Pressler.

OPENING STATEMENT BY SENATOR PRESSLER

Senator PRESSLER. Mr. Chairman, I am glad to join in this important hearing.

Let me say first, on a separate subject, that I shall be doing a speech on the Senate floor early next week about the fact that President Bush will have announced his plan to build a national high-speed data superhighway that will link more than 1,000 research sites around the country.

The President's bill is Senator Gore's bill basically, and I want to commend Senator Gore for his foresight and his leadership on this issue. I think that is a very important development, and I shall say why in my speech on the Senate floor. It will give smaller research industries and cottage research industries, not just those located near great universities, greater opportunities to access the resources that the large universities have.

The computer network across the United States that is envisaged in Senator Gore's bill, that has now been embraced by President Bush with some modifications, has a great potential. That network has been compared to the interstate superhighway system. The supercomputing network holds the same promise for boosting the American economy that the interstate highway system did 35 years ago.

I wanted to commend our chairman in that area, because I think that it is a significant accomplishment to have President Bush embrace Senator Gore's bill. However it is worked out, it is a step forward.

Senator GORE. If my colleague would yield, I certainly wish to express my appreciation for your kind words and acknowledge, for the record, the contributions that the Senator from South Dakota has made in refining and perfecting that proposal. I look forward to working with him throughout the remainder of this session to get this legislation out. And I really appreciate the cooperation and the partnership that we have had in moving that forward.

Thank you.

Senator PRESSLER. In terms of the subject at hand, I want to commend our witnesses. This is a Friday, and I am one of those Senators in the business of catching airplanes on Fridays, and I apolo-

gize if I leave a bit early, but I look forward to hearing the witnesses.

Senator GORE. Thank you very much.

We are going to have four witnesses today—Tucker Scully from the State Department, Dr. Peter Wilkniss from NSF, Lee Kimball from the Council on Ocean Law, and James Barnes, Executive Director of the Antarctica Project with Antarctic and Southern Ocean Coalition. We will begin with Tucker Scully.

I have enjoyed the chance to get to know you, Mr. Scully, and appreciate the long hours you put in on all these related issues, and without objection, the prepared statements of all of our witnesses will be included in full in the record. And if you care to summarize the high points of your statements, feel free to do so. If you need more time to go into more detail, we will give you as much time as we can, but please proceed.

I have a statement that Chairman Hollings would like to have included in the record.

[The statement follows:]

OPENING STATEMENT BY THE CHAIRMAN

Today's hearing is the first Congressional hearing in a while to focus on Antarctica. There have been several hearings on the Antarctica ozone hole and what is going on in the stratosphere over Antarctica, but too little attention has been paid to what is going on on the ground there.

I am pleased that the Committee is holding this oversight hearing on environmental problems in Antarctica. It is understandable that Antarctica has not been a hot issue in Congress—Antarctica is a very long way away, and there are not many voters here. But the Antarctica region covers a tenth of the planet and the Congress cannot afford to ignore it.

Both Senator Gore and I travelled to Antarctica late last year and saw first-hand some of the problems that will be discussed today. It was clear during our visit that, in the early days of the Antarctic research program, workers at McMurdo Station were much more worried about survival than about environmental protection. But the open dumps and the raw sewage outfall at McMurdo will be things of the past if NSF gets the money it needs for its proposed Safety, Environment, and Health initiative.

This is one of many, many high-priority programs at NSF which need additional funding. In the Antarctic Program there is a need for more funding for safety measures like adequate airplane navigation systems. On the research side, there is a pressing need for more dollars for research on the Antarctic ozone hole and its impact on the Antarctic ecosystem. And the Antarctic Program is just part of NSF's vital mission. Around the country, NSF is funding critically important basic research that will help keep this nation competitive, and helping to educate the scientists of tomorrow.

For these reasons and many more, I have been a strong supporter of the entire NSF budget. Last year the Commerce Committee passed an NSF authorization bill that would double the NSF budget over the next five years. We need more money for the agency and as the Appropriations process continues, I will be doing what I can to get it. The NSF clean-up program is just one example of why additional funding is necessary.

I am also pleased that the Committee is examining the need for international action on environmental protection in Antarctica. There are many complicated environmental issues which must be dealt with there, and the Congress will be involved in many of them. Later this year, the Senate will consider the Antarctic Minerals Convention, the latest addition to the Antarctic Treaty System, which could control minerals development in the Antarctic. The Commerce Committee will be very involved in that issue because of NSF's role in Antarctica and because the National Oceanic and Atmospheric Administration, which also falls under the Committee's jurisdiction, has a key role to play in monitoring the health of Antarctic marine ecosystems.

I will be working with Senator Gore and other members of the Committee to ensure that wise policy choices are made for Antarctica. We do not want to repeat

in Antarctica the same, often disastrous, mistakes that we have made on the other six continents.

Senator GORE. Mr. Scully.

STATEMENT OF R. TUCKER SCULLY, DIRECTOR, OFFICE OF MARINE SCIENCE AND POLAR AFFAIRS, DEPARTMENT OF STATE

Mr. SCULLY. Thank you, Mr. Chairman. I will to be brief.

As you mentioned, I have been involved in Antarctic matters for some time at the Department of State and have been involved in the various negotiations within the Antarctic Treaty system over the past ten years, including most of the discussions relating to measures to protect the Antarctic environment.

In the summary of my statement I would like to outline the elements of the Antarctic Treaty system which bear upon environmental protection, to look at the agenda which faces the Antarctic Treaty system with regard to questions relating to protection of the environment, and perhaps to make several comments about specific U.S. proposals that have been made and will be considered in the meeting which you referred to in October.

Let me start, however, with the Antarctic Treaty system itself. Concern for the protection of the environment has been a prominent element in the operation of that system.

The system began with the Antarctic Treaty itself, which was concluded in 1959 as a result of a U.S. initiative. It now comprises not only the Treaty itself, but also a wide range of measures that have been developed, recommendations that have been developed under the Treaty, as well as separate conventions that have been concluded resulting from initiatives within the consultative meetings held under the Treaty.

As a result there has been elaborated a framework for environmental protection which is continually being reviewed by the Treaty Parties.

Turning to the elements of the system, the Antarctic Treaty deals primarily with scientific research. It is an agreement which guarantees freedom of scientific research in Antarctica on the basis of the cooperative programs of scientific investigation that took place during the International Geophysical Year in 1958 and 1959.

It also establishes Antarctica as a zone of peace. It bans all military activities. It bans the testing of weapons. It bans and prohibits nuclear explosions and the disposal of radioactive waste in Antarctica.

Equally important, it provides an imaginative, juridical accommodation among its parties. Seven of those countries claim territorial sovereignty in Antarctica. The others, including the United States, neither assert nor recognize such claims.

The Treaty provides an imaginative, juridical accommodation which permits the claimant states and the non-claimant states to agree to disagree, to work together to apply common obligations to activities in Antarctica, in spite of their differences, and thus establishes the basis for international cooperation there.

I stress this point not only because it is directly linked to the Treaty's very important provisions relating to scientific research and the reservation of Antarctica exclusively for peaceful purposes,

but this accommodation has also been the basis for the further regulation of activities in Antarctica, the basis for agreement and co-operation in seeking to ensure that human activities in Antarctica do not result in adverse impacts upon the Antarctic environment.

The Treaty system provides for regular meetings of its Parties which have taken place at approximately two-year intervals. You, Mr. Chairman, referred to the next meeting of the parties in October of this year, which will take place in Paris. That will be the 15th Antarctic Treaty Consultative Meeting which has taken place since the Treaty entered into force.

The meetings of the Parties of the Treaty are open to those twelve original parties which signed the Antarctic Treaty, but are also open to other parties to the Antarctic treaty during such time as those parties demonstrate their interest in Antarctica by the conduct of substantial research there. Thus, there is an activities criterion for full participation in meetings held under the Antarctic Treaty.

You mentioned also, Mr. Chairman, the growth in interest in Antarctica. That is well demonstrated by the increase in membership in the Treaty system itself. There were originally 12 parties. There are now 39 parties to the treaty of whom 22 are consultative parties with full participation rights in the meetings held under the treaty. The other 17 non-consultative parties attend the meetings as observers.

At these meetings well over 150 recommendations have been adopted, agreed recommendations to governments. Many of these deal with the protection of the Antarctic environment, and I will note a few of them in terms of those which are relevant to the issues which face us at present.

The recommendations include the Agreed Measures for the Conservation of Antarctic Fauna and Flora which prohibit the taking of native mammals or birds in Antarctica except for in carefully circumscribed circumstances for scientific or other limited purposes.

The Agreed Measures prohibit the introduction of alien species. They limit acts which constitute harmful interference with the populations of native species in Antarctica and provide for the designation of specially protected species in specially protected areas in which human activities would be strictly limited to compelling scientific purposes.

Recommendations have also been adopted extending the concept of area protection to sites of special scientific interest; to establish a code of conduct for Antarctic expeditions and station activities which deals with waste disposal in Antarctica; to deal with requirements for environmental impact assessments of major activities in Antarctica; to provide safeguards for scientific drilling in Antarctica; and to deal with the siting stations as well as the activities of tourists and nongovernmental expeditions in Antarctica.

I also mentioned that separate agreements also have been concluded, separate treaties as a result of the operation of this consultative mechanism under the Antarctic Treaty. Three separate conventions have been concluded, one dealing with Antarctic seals in 1972; the second dealing with the conservation of Antarctic marine living resources, concluded in 1980; and finally, the minerals con-

vention that you mentioned, Mr. Chairman, the Convention on the Regulation of Antarctic Mineral Resource Activities, often known as the Wellington Convention.

The first two of those are in force. The Wellington Convention has been recently concluded. It was concluded in June, 1988, and we expect it will be sent forward shortly to the Senate.

I would note several points with regard to the latter two.

Senator GORE. If I could interject there, do you expect it to be brought into force? What is your outlook?

Mr. SCULLY. Do I expect the minerals convention to be brought in force? Yes, I do think it will be brought into force.

Senator GORE. How many treaty nations? It could be stopped if how many treaty nations objected?

Mr. SCULLY. One.

Senator GORE. Has not Australia already announced its intention to object?

Mr. SCULLY. Australia has announced that it does not intend to sign the convention and has announced that it will seek instead agreement among the parties to the treaty on a ban on mineral resource activities.

Senator GORE. What does that do to the convention?

Mr. SCULLY. It slows it down.

Senator GORE. Does it put it at risk?

Mr. SCULLY. It puts it at risk to a certain extent, yes.

Senator GORE. What is the French position?

Mr. SCULLY. The French position is of at least partial support for the Australian approach, as I understand it, although the French have not taken a decision with regard to signature of the convention.

Senator GORE. So, you have one and possibly two treaty nations who are not going along with it?

Mr. SCULLY. At the moment, that is the case, yes.

Senator GORE. So, your prediction that it will come into force rests upon an assumption that Australia will change its present position?

Mr. SCULLY. In a word, yes.

Senator GORE. All right, go ahead. We will come back to this.

Mr. SCULLY. I will come to the convention briefly in a moment.

I would make one note about the question of fisheries in Antarctica. Though a great deal of attention has been given to mineral resources, the primary resource interest in a real sense has centered on fishing activities in the waters around Antarctica which are extraordinarily productive.

The Convention on the Conservation of Antarctic Marine Living Resources, CCAMLR, is considered quite an innovative agreement from a resource management perspective in that it seeks to apply an ecosystem-wide approach to management of living resources in the waters around Antarctica.

The Convention has been in force now for seven years, and though its implementation has not been as fast, as we would like, it is making good progress toward the realization of its objectives.

At this time, we are in CCAMLR concentrating upon the development of the bases for assessment of the populations of living resource species in Antarctica, and secondly, developing measures to

apply to fisheries stocks depleted as a result of significant fishing activities, prior to the entry into force of the convention.

With respect to the minerals convention, Mr. Chairman, and I think we will come back to it, let me say a word or two about it.

The Convention establishes the necessary institutional and legal framework for determining acceptability of mineral resource activities in Antarctica. It is not an agreement that is designed to presume that such activities will or will not take place, but it is designed to provide a system for making decisions about such activities should interest in them emerge in the future.

The convention, we believe, establishes a very rigorous and salutary set of standards and procedures for determining whether or not activities should take place if interest in them were to develop, including procedures which would require that no activities take place unless there were information sufficient to judge their impacts.

I will conclude, Mr. Chairman, by addressing what is described in the prepared statement as the current environmental agenda for the Antarctic Treaty Parties. One need look only at the agenda for the upcoming consultative meeting itself to get an idea of the issues that face the Parties to the Treaty.

I have tried to describe the measures and steps that have already been taken, but in so doing I do not wish to give the impression that this is a completed system, a sufficient system for the protection of the environment. From the point of view of the United States, at least, the framework that has been established is imaginative and creative, but it needs constant care and feeding, constant updating, and constant extension.

At the meeting in October the parties will be considering an updated and more rigorous set of standards for waste disposal in Antarctica. We will be considering an extension of the protected area system in Antarctica. We will be considering concrete measures to deal with marine pollution in Antarctica including such incidents as the *Bahia Paraiso* spill, further measures to deal with tourism and nongovernmental expeditions, measures to deal with air safety, measures to deal with development and integration of the data base necessary to support and assess the effect of environmental measures and to identify the need for new measures in Antarctica.

The focus, I think, of the consultative meeting in October will be the question of comprehensive measures for the protection of the Antarctic environment. The delegation of Chile suggested the incorporation of that item on the agenda for the meeting, and a number of parties have indicated that they see this as the central item for consideration. Both Australia and France jointly, and New Zealand have made and circulated specific proposals on the subject.

The United States will, itself, work diligently to ensure a constructive result on this item as well. We believe that we should start and develop a structured program of work to approach the question of comprehensive measures. From our perspective, what needs to be done is to start with the existing framework, the existing set of measures, and to apply to that network that network of environmental protection, a series of criteria to ensure that we identify the kinds of steps that need to be taken and can set up a

schedule for taking those steps in a way that will lead to concrete results.

Specifically the Treaty Parties at the upcoming meeting should look at the framework for environmental protection with the following criteria in mind: first, to identify the provisions, the specific elements of that framework that need to be updated, strengthened or improved; secondly, to identify and fill in the gaps in the existing framework, the existing set of environmental protection measures; thirdly, to deal with and clarify and strengthen where necessary the nature of the legal obligations contained in the existing measures or future measures to ensure better compliance and enforcement of those measures. Fourthly, I think we need to ensure and work toward ensuring the integration and consistency of the various categories of environmental protection provisions to ensure that they are all pulling in the same direction. And, finally, we will look toward the development of integrated programs for monitoring to ensure that there is a basis for assessing the effect of the environmental measures that have been taken and as an early warning system to detect the need for new measures.

There, Mr. Chairman, I think I should conclude. I probably overstepped my time a bit anyway. I would be delighted to elaborate on these points. I have been asked to address the question of the Bahia Paraiso. You have mentioned that. I think we could come back to it, but I would note that the kind of cooperation that took place in seeking to respond to this unfortunate accident is one we would like to see built upon in taking the environmental measures necessary to ensure that the odds of any such accident taking place in the future are reduced to a minimum. Thank you very much.

[The statement and questions and answers follow:]

STATEMENT OF R. TUCKER SCULLY, DIRECTOR, OFFICE OF OCEANS AFFAIRS, DEPARTMENT OF
STATE

I am R. Tucker Scully, Director of the Office of Oceans Affairs in the Bureau of Oceans and International Environmental and Scientific Affairs (OES) at the Department of State. It is a pleasure to appear before the Subcommittee to discuss environmental issues relating to Antarctica. As head of U.S. delegations to meetings of the Parties to the Antarctic Treaty, I have been deeply involved in international efforts to address these issues.

Concern for the protection of the Antarctic environment has been one of the dominant elements in the operation of the Antarctic Treaty and the system of agreed recommendations, measures and separate agreements that have grown up around the Treaty. From 1959, when the Antarctic treaty was negotiated, it has been recognized that human activities in Antarctica require careful attention to avoid adverse impacts upon its environment and to maintain its value as a location for studying and monitoring global processes.

The current environmental agenda for the United States and the other Parties to the Antarctic Treaty is a full one as they extend and adapt the Antarctic Treaty system's framework for environmental protection to changing circumstances. These circumstances now involve increases in the nature and scale of human activities taking place or contemplated in Antarctica as well as growing recognition of the importance of the polar regions in the environment of the planet. Before turning to this agenda, a brief description of the Antarctic Treaty system and the framework for environmental protection it has elaborated is in order.

The Antarctic Treaty: At the heart of the Antarctic Treaty system is the Antarctic Treaty of 1959 (which entered into force in 1961). It places on a permanent basis the system of peaceful international cooperation in scientific research which evolved on an ad hoc basis during the International Geophysical Year of 1957-58.

The Antarctic Treaty guarantees freedom of scientific research in Antarctica. It calls for plans for scientific investigations to be shared in advance and the results of scientific investigations to be shared and made freely available.

Equally important, the Treaty establishes Antarctica as a zone of peace reserved exclusively for peaceful purposes. It bans all military activities, including the testing of weapons, and prohibits nuclear explosions and the disposal of radioactive waste. In addition, it provides an absolute right of on-site inspection of all stations and installations in Antarctica to promote the objectives of the Treaty and ensure compliance with its provisions.

To achieve these purposes, the Antarctic Treaty had to deal with basic legal and political differences over the status of Antarctica. Seven of the original signatories -- Argentina, Australia, Chile, France, New Zealand, Norway and the United Kingdom -- assert claims to territorial sovereignty in Antarctica. The other five original signatories -- the United States, the Soviet Union, Japan, Belgium and South Africa -- neither assert nor recognize such claims. Through an imaginative juridical formulation which permits the parties to agree to disagree over the

sovereignty issue, the Treaty establishes a basis for international cooperation in Antarctica. In effect, for those activities with which it deals, the Treaty provides means for its parties -- starting from different legal assumptions -- to apply common obligations to activities in Antarctica.

As is implied above, the Antarctic Treaty did not deal with all possible activities ~~in Antarctica~~. Its substantive provisions, including the juridical accommodation, apply to activities relating to scientific research and the reservation of Antarctica exclusively for peaceful purposes. They do not, for example, extend to resource activities.

At the same time, the Treaty provides a mechanism for dealing with new activities and new circumstances. This mechanism, which is contained in Article IX of the Treaty, provides that for meetings of the twelve original contracting parties first within two months of entry into force of the Treaty and at suitable intervals thereafter, for the purpose of exchanging information, consulting together on matters of common interest pertaining to Antarctica and recommending to their governments measures in furtherance of the principles and objectives of the Treaty.

The Treaty also provides that these consultative meetings, as they are now called, are open not only to full participation by representatives of the twelve original contracting parties but also to representatives of any acceding party during such time as that party demonstrates its interest in Antarctica by the conduct of substantial scientific research there. There are now twenty-two parties (Antarctic Treaty Consultative Parties or ATCPs) with full rights of participation in these meetings -- Poland, Federal Republic of Germany, Brazil, India, China, Uruguay, German Democratic Republic, Italy, Spain and Sweden have joined the twelve original Consultative Parties. In addition, representatives of all other parties to the Antarctic Treaty also participate in consultative meetings as observers. There are also seventeen non-Consultative Parties (NCPs) -- Austria, Canada, Colombia, Bulgaria, Czechoslovakia, Cuba, Denmark, Ecuador, Finland, Greece, Hungary, Democratic Peoples Republic of Korea, Republic of Korea, Netherlands, Papua New Guinea, Peru and Romania.

There have been fourteen Antarctic Treaty Consultative Meetings (ATCMs) since the Antarctic Treaty entered into force, at approximately two year intervals -- with the next, scheduled for October in Paris. As a result of these ATCMs, over one hundred and fifty agreed recommendations have been adopted by the Consultative Parties.

The Antarctic Treaty System: The agreed

- recommendations adopted at the ATCMs incorporate a wide-range of measures to give effect and elaborate the principles and purposes of the Antarctic Treaty. A significant proportion of these recommendations deal with protection of the Antarctic environment.

Among these provisions are the Agreed Measures for the Convention of Antarctic Fauna and Flora. The Agreed Measures:

- a) prohibit the taking of mammals or birds native to Antarctica (with carefully circumscribed exceptions to provide for collection of specimens for valid scientific or museum purposes or to provide essential food for humans or dogs);
- b) prohibit the introduction of any species of plant or animal not indigenous to Antarctica (with carefully circumscribed exceptions);
- c) limit acts or activities which institute harmful interference with the living conditions of native birds or mammals;

- d) provide for designation of specially protected species;
- e) provide for the designation of specially protected areas with strict limitations upon human activity to protect unique ecological systems.

The concept of area protection incorporated in the Agreed Measures has been extended by recommendations providing for designation of Sites of Special Scientific Interest (SSSIs) in which human activity is limited to preserve unique research opportunities and providing for designation of historic sites and monuments.

Scientific expeditions and stations in Antarctica have also been the subject of specific recommendations. These include recommended procedures for waste disposal in the Code of Conduct for Antarctic Expeditions and Station Activities, provision for environmental impact assessment (EIA) with guidelines for carrying out EIAs, guidelines incorporating safeguards for scientific drilling in Antarctica, and provision for consultation among those operating scientific stations in the same vicinity to avoid, inter alia, adverse environmental impacts arising from cumulative impacts.

Finally, there have been a series of recommendations which seek to develop guidelines and recommended practices for visitors to Antarctica, including tourists and non-governmental expeditions, to ensure that their activities do not result in harmful impacts.

Equally important from the environmental perspective, the ATCMs have provided the mechanism for the ATCPs to delineate and respond to the challenge of possible resource activities in Antarctica. Recommendations adopted at ATCMs have included initiatives which have lead to the conclusion of three separate treaties.

- the Convention on the Conservation of Antarctic Seals; (concluded in 1972, entered into force in 1978);
- the Convention on the Conservation of Antarctic Marine Living Resources (concluded in 1980, entered into force in 1982); and
- the Convention on the Regulation of Antarctic Mineral Resource Activities (concluded in 1988, not in force).

The Convention on the Conservation of Antarctic Seals

(CCAS): The Antarctic Seals Convention establishes limitations upon, and provides a mechanism to deal with, commercial sealing in Antarctica. It was negotiated primarily as a precautionary measure in light of concern over the possible re-initiation of pelagic commercial sealing in Antarctica. Interest in such sealing has not materialized as was confirmed at the meeting of Parties to CCAS in September, 1988.

The Convention on the Conservation of Antarctic Marine

Living Resources: The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) resulted from an initiative taken at ATCM IX in London in 1977. The Convention represents a precedent-setting effort to develop and apply an ecosystem-wide management approach to the waters surrounding Antarctica. Its objective is to ensure that any harvesting of Antarctic marine living resources is consistent not only with the health of target populations but also with that of dependent and related species and with maintenance of ecological relationships.

Consistent with its conservation objectives, the Convention applies to a geographic area defined to approximate the full extent of the Antarctic marine

ecosystem. This area, defined by specific coordinates, extends to those waters found south of the Antarctic Convergence, or polar front, which is the transition zone between Antarctic waters to the south and warmer sub-Antarctic waters to the north. It should be noted that the Convention area is considerably larger than that covered by the Antarctic Treaty (which applies to the area south of 60° South Latitude).

The Convention establishes the Commission for the Conservation of Antarctic Mineral Living Resources, headquartered in Hobart, Tasmania; the Scientific Committee for the Conservation of Antarctic Marine Living Resources, charged with providing objective scientific assessments and recommendations to the Commission; and a secretariat to serve both the Commission and Scientific Committee. The Convention provides that the Commission will operate on the basis of a consensus -- or no-objection -- procedure which has been characteristic of the Antarctic Treaty system.

There are now 24 Parties to CCAMLR, of whom 20 are members of the Commission. Preparations are being made for its eighth annual meeting. Since the entry into force of CCAMLR in 1982, there has been steady progress in the development of the scientific and data bases for population

assessments, on the delineation and implementation of conservation measures particularly those aimed at restoration of fishery stocks depleted during the 1970s and in elaborating a system of observation and inspection. Concerted action by Parties to CCAMLR will continue to be necessary to achieve its conservation objectives.

The Convention on the Regulation of Antarctic Mineral Resource Activities: The Convention on the Regulation of Antarctic Mineral Resource Activities was adopted in June, 1988 at a conference in Wellington, New Zealand. The Wellington Convention, as it is frequently called, establishes the necessary legal and institutional framework for determination of the acceptability of mineral resource activities in Antarctica, should interest in them emerge in the future, and for regulating any activities determined to be acceptable. An important underlying purpose of the negotiation of the Convention was to ensure that questions relating to Antarctic mineral resource are dealt with in the spirit of the Antarctic Treaty and, therefore, do not become the object of international dispute or conflict.

Since it is not known if and when commercial interest in Antarctic mineral resource activities might emerge, which minerals might be the object of such interest, or in which

areas of Antarctica they might exist, the Wellington Convention is of necessity a framework agreement. It does not articulate detailed rules and regulations for possible Antarctic mineral resource exploration and development activities. Rather, it prescribes the principles and criteria, including stringent environmental standards, upon which decisions about mineral resource activities must be based; establishes the process within which possible exploration and development activities would be considered and how detailed rules and regulations would be developed for any permitted activities; and provides for the institutions (including their composition, functions and decision-making procedures) for administering and overseeing this process. These institutions include a Commission, with general regulatory authority; Regulatory Committees, with specific responsibilities for particular geographic areas; and a scientific, technical and environmental advisory committee.

The Convention is the result of a detailed six year negotiation among the Parties to the Antarctic Treaty. The conclusion of the Convention, itself, as well as its substantive content do not establish any presumption as to whether mineral resource activities will take place in Antarctica. Its provisions are designed to avoid any artificial incentives or disincentives for such activities.

The Convention establishes rigorous environmental requirements for judging possible Antarctic mineral resource activities. Exploration and development in any area of Antarctica could not be considered unless there were a consensus among members of the Commission that such activities could be consistent with these requirements. The Convention's environmental standards include requirements that no activity be permitted unless there is information adequate to assess its possible environmental impacts and unless such an assessment indicates no unacceptable impacts. The Convention would provide the predictability and stability required for investment in any Antarctic mineral exploration and development which could meet its standards.

The Environmental Agenda: As a result of the operation of the Antarctic Treaty system, an extensive and dynamic framework for the protection of the Antarctic environment has been established. The completion of the Wellington Convention to deal with possible mineral resource activities represents an effort to extend this framework to the primary category of possible activity in Antarctica hitherto unprovided for.

I do not wish to imply, however, that the framework of measures elaborated within the Treaty system should be considered as sufficient or complete. One need only look to

the list of action items for the next Antarctic Treaty Consultative Meeting - ATCM XV to be held in Paris in October - to realize that this framework requires ongoing review and elaboration to ensure realization of the collective concern for the environment asserted by the Parties to the Antarctic Treaty.

The agenda for ATCM includes a number of items of specific environmental importance, including:

- adoption of an updated and more rigorous set of waste disposal practices for Antarctica;
- provision for the designation of new categories of protected areas, including a category to deal with multiple use situations;
- adoption of concrete measures to prevent marine pollution, including development of capability to respond to pollution incidents and ensuring that existing international marine pollution conventions are strictly applied in Antarctica;
- further consideration of tourism and non-governmental expeditions in Antarctica;

- steps to improve navigational charts for Antarctica and to ensure the ready availability of such charts;
- adoption of measures to improve the safety of aircraft operations in Antarctica;
- further work to identify, develop and integrate data base on Antarctica environmental data base.

The United States will approach ATCM XV with the objective of securing concrete results on each of these items.

Moreover, there is a general item on the agenda of ATCM XV on comprehensive measures for the protection of the Antarctic environment. This item has become a focus of attention for many Treaty Parties. Australia and France have proposed that this item include consideration of a comprehensive environmental convention, a proposal which is related to their reservations regarding the Wellington Convention. Other Parties, including Chile and New Zealand who have signed the Wellington Convention, see this item as an opportunity to take an overall review of the environmental measures and recommendations adopted at ATCMs.

In my view, Mr. Chairman, the Parties to the Antarctic Treaty have been engaged in articulating a system comprehensive measures for some time. To this end, the United States has made important proposals for ATCM XV to fill the gaps in the Treaty system's environmental framework, including specific proposals on waste disposal, protected areas and marine pollution. At the same time, we supported inclusive of the item on item on comprehensive measures and will work at ATCM XV and beyond to ensure that this objective is achieved. From our perspective, it is important that consideration of comprehensive measures be carried out on the basis of a clear and integrated program of work. Specifically, the U.S. will seek a thorough appraisal of the existing framework for environmental protection in order to:

- identify those provisions which should be updated, strengthened or otherwise improved;
- identify and fill in the gaps in the existing network of environmental protection measures;
- clarify and strengthen the nature of the relevant legal obligations to ensure better compliance with environmental protection measures.

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- ensure integration and consistency among the various categories of environmental protection provisions;
- ensure monitoring necessary to assess the effectiveness of existing measures and to identify the need for additional measures.

In pursuing this program of work on comprehensive measures, I believe that we should establish milestones, including agreement at ATCM XV on the specific action items on its agenda. It also seems to me that the requirements for ensuring that environmental protection in Antarctica is treated in an integrated and comprehensive fashion, as well as for ensuring support of cooperative scientific research in Antarctica - which remains the primary human activity there - both demonstrate the need for the Parties to the Antarctic Treaty to move to develop a permanent infrastructure to support the ATCM mechanism. The U.S. has proposed the consideration of steps to initiate establishment such infrastructure at ATCM XV.

Mr. Chairman, in your invitation to testify before the Subcommittee, you asked that I address specific points relating to the Wellington Convention and the Bahia Paraiso oil spill in Antarctica. With respect to the Wellington

Convention, I would note my view that it represents a landmark international agreement from the environmental perspective - particularly in its prohibition upon activities unless there is information adequate to assess their impacts and the requirement that such assessment be undertaken against very rigorous standards. As noted, the U.S. believes that the framework for environmental protection in Antarctica should be comprehensive and integrated. Implementation of the Wellington Convention is a key element in that framework and, in my view, offers important precedents for regulating human activities in Antarctica generally.

On the final point, as you know the Bahia Paraiso an Argentine navy vessel engaged in resupply of Argentine scientific stations ran aground on January 28, 1989, in Arthur Harbor, adjacent to the Palmer Station, the U.S. research facility in the Antarctic peninsular. The grounding resulted in significant spillage of oil, the long term of effects of which are the subject of ongoing study. There were, however, localized adverse impacts upon biota and the U.S. research activities were adversely affected. It should be noted that the vessel had landed a group of tourists at Palmer Station just prior to the accident.

As I understand it, the cause of the accident is under judicial investigation in Argentina and there has been no determination of how to dispose of the vessel which remains aground, with some fuel still aboard, in Arthur Harbor. From the international perspective, the incident illustrates the need to strengthen measures to prevent pollution from vessels, including consideration of contingency planning and issues of liability. (On the latter point, the only agreement within the Antarctic Treaty system to address liability is the Wellington Convention and that would apply only to possible mineral resource activities, not to logistics operation in support of science or tourism.) All of these matters are to be addressed, at U.S. suggestion, at ATCM XV. Parties to the Antarctic Treaty - in keeping with Antarctic practice - pooled their efforts in seeking to respond to this unfortunate accident. We would hope that this same spirit will be reflected in launching effective steps at ATCM XV to prevent similar accidents or other forms of marine pollution in the future.

SENATOR HOLLINGS FOLLOW-UP QUESTIONS

Q. Given the position of other Antarctic Treaty nations, do you think the idea of an Antarctic park would be workable?

A. In attempting to answer this question, it should be noted that there is no agreed understanding as to what is meant by an Antarctic park. The term, and related expressions ("world park", "wilderness park"; "wilderness reserve"), have been used to refer to a number of objectives ranging from stricter regulation of activities in Antarctica to a ban on mineral resource activities or even a prohibition of all human activities there.

In addition, Australia and France, at the Fifteenth Antarctic Treaty Consultative Meeting (ATCM XV) in Paris, October 9-20, 1989, put forward a proposal for a comprehensive environmental convention including designation of Antarctica as a "natural reserve/land of science". Though the proposal does not specifically mention mineral resources, it has been linked with the call for a permanent ban on mineral resource activities in Antarctica put forward by Australia in May, 1989.

In consequence, probably the most common perception of an Antarctic park is that it involves a permanent ban on mineral resource activities as called for by Australia. This proposal for a ban has received little support among the Antarctic Treaty Consultative Parties (ATCPs). Seventeen of the twenty-five ATCPs have signed the Antarctic Minerals Convention (Argentina, Brazil, Chile, China, Finland, German Democratic Republic, Japan, Korea, New Zealand, Norway, Poland, South Africa, Sweden, U.K., U.S.S.R., U.S. and Uruguay). These Parties, at ATCM XV in Paris, opposed the Australian-French proposal for a comprehensive convention because, *inter alia*, it was seen as an effort to set aside or replace the Antarctic Minerals Convention (see below). France, Belgium and Italy have supported the proposal for a comprehensive convention, without addressing the question of a ban directly. (Belgium has enacted domestic legislation prohibiting Belgian nationals from undertaking mineral resource activities in Antarctica; the Italian Parliament has passed a non-binding resolution opposing the Antarctic Minerals Convention.) The remaining ATCPs (the Federal Republic of Germany, India, Peru and Spain) have not taken a position.

The lack of support evidenced in Paris for the Australian proposal for a ban is itself one indication of its infeasibility. Institution of this proposal would require a consensus of the ATCPs. Since such consensus seems unlikely, there is concern that the Australian initiative could result in the lack of an agreed basis for determining the acceptability of mineral resource activities in Antarctica - with the future possibility of unregulated or, at best, inadequately regulated

activities. With respect to the substantive workability of the Australian proposal for a ban, most ATCPs view the Antarctic Minerals Convention as a more viable basis for dealing with the possibility that commercial activity might emerge in the future. Three reasons appear to underlie this attitude.

First, the concept of a permanent ban is misleading. Even if there were the necessary consensus of the ATCPs to declare a ban, it would be permanent only so long as individual ATCPs continued to support it. The Antarctic Minerals Convention would prohibit consideration of exploration for and development of mineral resources in any area of Antarctica unless there were consensus of all decision-making Parties to the Convention that such activities could accord with the Convention's environmental standards.

Second, the ban would purport to decide for all time that mining in Antarctica could not take place in an environmentally acceptable fashion, regardless of future facts and circumstances. The Antarctic Minerals Convention provides that a determination of the acceptability of mining should be made only if and when interest in such activities emerge, in light of the facts and circumstances at the time and against the rigorous environmental standards and procedures included in the Convention.

Third, if a consensus were to emerge that mineral resource activity should be considered in Antarctica - however unlikely that event seems now - the Antarctic Minerals Convention would provide an agreed and rigorous process for structuring such consideration. The "permanent" ban, if broken or lifted, would offer no such safeguards. The worst circumstances in which to seek to negotiate an agreed process for considering mining would be after commercial interest in it had become widespread.

The Parties to the Antarctic Treaty at ATCM XV considered the question of comprehensive measures for the protection of the Antarctic environment, an item proposed by the delegation of Chile. They agreed to set as a priority objective "the further elaboration, maintenance and implementation of a comprehensive system for the protection of the Antarctic environment and its dependent and associated ecosystems ..." The United States, Australia and France - and all Treaty Parties - endorsed and share this objective.

The United States and the majority of the ATCPs believe that such a comprehensive system should build upon the extensive network of environmental protection already elaborated within the Antarctic Treaty system, including the Antarctic Minerals Convention.

A system of protected areas will be an important part of the comprehensive system for protection of the Antarctic environment to which the Treaty Parties have committed themselves. Under the Agreed Measures for the Conservation of

Antarctic Fauna and Flora (1964), Antarctica has been designated as a Special Conservation Area within which the taking of native species is prohibited, except for strictly defined scientific or subsistence purposes. Provision has also been made for setting aside areas of special ecological significance and areas of particular scientific value - Specially Protected Areas (SPAs) and Sites of Special Scientific Interest (SSSIs), respectively. There are currently 19 SPAs and 31 SSSIs, designated by the Treaty Parties. In addition, over 50 historic sites and monuments have been designated.

Action was taken at ATCM XV to extend the protected area system in Antarctica in significant degree. The Treaty Parties agreed to provide for the designation of two new categories of protected area: first, Specially Reserved Areas (SRAs) to protect areas of outstanding geological, glaciological, geomorphological, aesthetic, scenic or wilderness value; and second, Multiple-Use Planning Areas (MPAs) to provide means for coordinating human activities in areas where such activities pose risks of mutual interference or cumulative environmental impacts.

The Antarctic Protected Areas system, as it has evolved, provides for setting aside areas or parks for a wide variety of environmental and scientific purposes.

Q. Just what is America's national interest in the Minerals Convention? In other words, what does the United States get out of the Convention?

A. The Antarctic Minerals Convention represents the most balanced and environmentally sound framework that could be achieved to deal with possible mineral resource activities in Antarctica. It would establish an agreed system for determining the acceptability of mineral resource activities, should interest in them emerge in the future, and for governing any such activities determined to be acceptable.

The Convention serves basic United States interests in Antarctica. From the political perspective, the United States objective was the preservation of the principles and purposes of the Antarctic Treaty which has made Antarctica an effective zone of peace reserved exclusively for peaceful purposes. Achievement of the Convention, as well as the content of its provisions, in our view, will ensure that questions relating to mineral resources will be treated in accordance with these principles and purposes and will not become the object of international dispute or conflict.

From the environmental perspective, the United States objective was to ensure the protection of the Antarctic environment. The Convention, in our view, is a landmark in the evolution of international environmental law and its environmental provisions are unique in their rigor and content. They include a prohibition on consideration of exploration for and development of mineral resources in any area of Antarctica unless there is a consensus of the decision-making Parties to the Convention that such activities could accord with the Convention's standards. Among these standards is the requirement that decisions about Antarctic mineral activities must be based on information adequate to enable informed judgments to be made about their possible impacts and that no such activities take place unless this information is available for decisions relevant to those activities.

From the resource management perspective, the United States objective was to ensure that U.S. operators have the opportunity to seek to engage in any mineral resource activities determined to be acceptable on a fair and non-discriminatory basis. In our view, the Convention preserves this opportunity.

Q. Could you provide a summary of the results of the Paris meeting of the Antarctic Treaty Nations? In particular, how have the prospects for the Antarctic Minerals Convention changed in light of the Paris meeting? What are the prospects for negotiation of comprehensive measures for the protection of the Antarctic environment? Was progress made on the other environmental protection provisions on the agenda?

A. The Fifteenth Antarctic Treaty Consultative Meeting (ATCM XV) took place in Paris, October 9-20, 1989. Twenty-two recommendations were adopted by consensus, representing very considerable progress in furthering the principles and purposes of the Antarctic Treaty, with particular emphasis upon protection of the environment of Antarctica and promotion of scientific research there.

With respect to the highly visible item of comprehensive measures for the protection of the Antarctic environment, two consensus recommendations were adopted. The first calls for the "further elaboration, maintenance and effective implementation of a comprehensive system for the protection of the Antarctic environment" and for a special meeting in 1990 to contribute to this objective. The second calls for a meeting, also in 1990, to initiate work in relation to the liability protocol called for in the Antarctic Minerals Convention. In each case, the meetings are to consider all proposals. Chile offered to host both meetings with the invitations to be conveyed (and dates selected) following its December elections.

ATCM XV also achieved important results with respect to the other items of its agenda, many of which will form essential elements in a comprehensive system for the protection of the Antarctic environment. These include:

- 1) a tough set of practices governing the disposal of wastes generated in Antarctica, cast in legally binding terms;
- 2) concrete measures to prevent marine pollution and obligations to respond, and to cooperate in responding, to pollution incidents, including development of contingency plans;
- 3) significant extension of the Antarctic protected area system;
- 4) provision for integrated programs of environmental monitoring of both global processes and the impacts of human activities in Antarctica;
- 5) provision for the development of a data base for Antarctic scientific and environmental data;
- 6) provisions designed to avoid over-concentration of stations in Antarctica;

- 7) measures to improve safety of activities in Antarctica, including agreed procedures for aircraft operations and steps to improve the charting of Antarctic waters and the availability of existing charts;
- 8) a call for additional steps to deal with ozone depletion, including increased research in Antarctica; and
- 9) provisions calling for greater integration of Antarctic scientific efforts into international programs of study of global change, including climate change.

There was considerable opportunity for informal discussion among the Treaty Parties of the Antarctic Minerals Convention immediately prior to and during ATCM XV. These contacts indicated that the great majority of the ATCPs continue to support the Convention. Two ATCPs have signed the Convention since the Paris meeting, so that seventeen of the twenty-five ATCPs have now signed (Argentina, Brazil, Chile, China, Finland, German Democratic Republic, Japan, Korea, New Zealand, Norway, Poland, South Africa, Sweden, U.K., U.S.S.R., U.S. and Uruguay).

The United States achieved its basic objectives at ATCM XV and considers its outcome highly successful, particularly from the environmental perspective. Most of the specific actions at the meeting resulted from U.S. initiative. Our only disappointment was the lack of progress on development of an infrastructure/secretariat for the Antarctic Treaty, an issue which was deferred for future meetings.

With respect to the issue of comprehensive measures for the protection of the Antarctic environment, there was little support for the Australian-French proposal for a new comprehensive convention. The great majority of the ATCPs saw the Australian-French proposal as inconsistent with their view that comprehensive measures should be based upon the extensive network of environmental protection provisions already elaborated within the Antarctic Treaty system, including the Antarctic Minerals Convention. At the same time, all Parties share the objective of a comprehensive system for the protection of the Antarctic environment and the consensus achieved on the recommendations dealing with comprehensive measures (see above) augurs well for future progress. The recommendations outline a program of work (based on a U.S. working paper) that calls first for identification the substantive elements of a comprehensive system and only thereafter for addressing the issue of form (e.g., convention, protocol or agreed measures). In our view, an approach of this sort, building upon the existing components of the Antarctic Treaty system, will lead to a successful result.

SENATOR GORE FOLLOW-UP QUESTIONS

Q. How seriously are other nations taking the Australian proposal for a ban on mining in Antarctica? Are other nations re-evaluating their positions? Which ones?

A. The Australian proposal for a ban on mining in Antarctica is generally viewed as linked, in part, to increased public awareness of environmental issues and, in this sense, as reflective of serious concern. At the same time, informal discussions during the Fifteenth Antarctic Treaty Consultative Meeting (ATCM XV) demonstrated that the great majority of the Antarctic Treaty Consultative Parties (ATCPs) support the Antarctic Minerals Convention and consider it a more effective means for ensuring the protection of the Antarctic environment than the Australian proposal. Two ATCPs signed the Convention following ATCM XV, so that seventeen of the twenty-five ATCPs have now signed (Argentina, Brazil, Chile, China, Finland, German Democratic Republic, Japan, Korea, New Zealand, Norway, Poland, South Africa, Sweden, U.K., U.S.S.R., U.S. and Uruguay). Australia and France support a ban. Belgium has enacted domestic legislation prohibiting Belgian nationals from undertaking mineral resource activities in Antarctica and the Italian parliament has passed a non-binding resolution opposing the Convention. The remaining ATCPs (the Federal Republic of Germany, India, Peru and Spain) have not taken a position.

Q. In light of these developments, how likely do you think it is that the Convention will be approved?

A. For the Antarctic Minerals Convention to enter into force, it must be ratified by sixteen of the twenty ATCPs that adopted it by consensus in June, 1988. Nine ATCPs, (the seven claimant states, the United States and the Soviet Union), must be among the sixteen. Therefore, Australia by itself could prevent entry into force of the Convention.

At the same time, there is little prospect that the alternative to the Convention proposed by Australia will command necessary support. Thus, it could lead to a situation in which there were no agreed basis for dealing with possible mineral resource activities in Antarctica. The political and environmental consequences of such an eventuality are such that it is my view that the Convention will ultimately achieve necessary support - most likely in the context of the comprehensive system for the protection of the Antarctic environment to which all Treaty Parties have committed themselves.

Q. Why do the Antarctic Treaty nations rely upon self-enforcement?

A. The obligations contained in an international treaty are undertaken by the Parties to that treaty. It is the responsibility of the individual Parties to ensure that those subject to their jurisdiction comply with the provisions of the treaty. Self-enforcement, in this sense, is a basic feature of general treaty practice, including the Antarctic Treaty.

The Antarctic Treaty adds a number of provisions designed to supplement the basic obligations of the Parties to ensure compliance. These include an unlimited right of each ATCP to on-site inspection of all stations and installations in Antarctica to ensure that the provisions and purposes of the Treaty are being observed by all and obligations to take appropriate efforts, consistent with the United Nations Charter, to the end that no one engages in any activity in Antarctica contrary to the principles and purposes of the Treaty.

Concern for efficacy and uniformity in compliance with the provisions of the Treaty and measures adopted under it has led to increasing exercise of the inspection rights accorded under the Treaty. In addition, at ATCM XV emphasis was placed in developing substantive measures to cast them in the form of concrete legal obligations to remove any uncertainties as to the responsibilities of governments to enforce compliance with them. This practice represents a continuing trend. Finally, the exchange of information called for under the Treaty is an additional means of gauging compliance and the Treaty Parties are identifying additional categories of information whose exchange will demonstrate the specific steps being taken regarding compliance with Treaty provisions and measures.

Q. Will the Minerals Convention be any different from other parts of the Treaty system?

A. The Antarctic Minerals Convention differs from the other components of the Antarctic Treaty system in that the activities that it covers are prohibited unless authorized in accordance with the agreement. Authorization of prospecting may be made by an individual Party, but only if it determines that such activity accords with the standards of the agreement as well as the specific rules concerning prospecting that it contains. Authorization of exploration and development in any area of Antarctica may only occur pursuant to a series of collective decisions by the Parties to the Convention, including a threshold decision, requiring consensus, that consideration of such activities would accord with the environmental standards and procedures of the Convention.

The decision-making presumptions of the Antarctic Minerals Convention are such that no mining activities could be considered unless all decision-making Parties (all members of the Commission to be established) were satisfied that such activities could accord with the strict standards contained in the Convention.

The Convention requires Parties to take all measures within their competence to ensure compliance with it and any measures in effect pursuant to it. An operator undertaking any activities pursuant to the Convention must be sponsored by a Party and that Party has explicit and detailed obligations to certify the qualifications of such operator, as well as to ensure compliance. For example, the sponsor has an unqualified duty to see that there exists effective pollution response capability for any activity it sponsors, including the ultimate responsibility for ensuring that any necessary response action is taken.

The Antarctic Minerals Convention incorporates inspection provisions analogous to those contained in the Antarctic Treaty which entitle each decision-making Party to carry out inspections to ensure compliance. The Convention goes beyond these individual national rights of inspection and accords to institutions (the Commission and regulatory committees) identical rights to carry out inspections. No exploration or development activities could be permitted until this dual national/institutional system of inspection had been elaborated.

In addition to the inspection provisions, the Convention contains a number of innovative requirements to promote and ensure compliance. These include:

- 1) provision for compulsory settlement of disputes between Parties to the Convention applicable to the major categories of potential disputes, including any dispute relating to the protection of the environment;

- 2) provision for review of any regulatory committee decisions relating to exploration or development through a combination of judicial procedures and oversight by the Commission;
- 3) extensive requirements upon the institutions to monitor any Antarctic mineral resource activities;
- 4) provision for the institutions to determine and apply sanctions, including loss of rights and monetary penalties, for non-compliance by operators;
- 5) application of strict (no-fault) liability, with limited defenses, to any operator undertaking Antarctic mineral resource activities (The Convention also calls for further elaboration of its liability provisions in a protocol to be adopted by consensus that must be in force prior to consideration of any exploration and development activities.);
- 6) provision for observer participation in meetings of the Commission and the Scientific, Technical and Environmental Advisory Committee; and
- 7) extensive provisions for ensuring a complete and public record of the operation of the institutions called for under the Convention.

SENATOR KERRY FOLLOW-UP QUESTIONS

Q. There are many different ideas about what such a (comprehensive conservation) convention should include. What do the Australians have in mind? What is the State Department's position on a Conservation Convention?

A. At the Fifteenth Antarctic Treaty Consultative Meeting (ATCM XV) held in Paris, October 9-20, 1989, under the agenda item on comprehensive measures for the protection of the Antarctic environment, working papers were tabled by the United States, by New Zealand and by Chile, as well as by Australia and France jointly.

The proposal put forward by Australia and France called for a comprehensive convention for the protection of the Antarctic environment which would establish Antarctica as a "natural reserve/land of science". In a related working paper, they outlined a number of possible components for such a comprehensive convention. Basically, the paper suggests that the convention include general principles regarding comprehensive protection of the Antarctic environment, types of activities to be regulated and appropriate protective mechanisms and proposed that institutions be set up to implement these principles (an environmental commission, a scientific and technical committee and an arbitration body, assisted by a secretariat and an inspection and monitoring corps). A copy of the Australian-French working paper is attached.

There was little support for the Australian-French proposal. The great majority of the Antarctic Treaty Consultative Parties (ATCPs) endorsed the approach taken in the U.S. and New Zealand working papers of building upon the components of the Antarctic Treaty system, and the measures elaborated pursuant to it, to create a comprehensive system for ensuring the protection of the Antarctic environment. (Copies of the U.S. and New Zealand working papers are attached.)

Opposition to the Australian-French proposal reflected several perceptions. First, it was widely viewed, and was so characterized by France and Australia, as aimed at replacing the Antarctic Minerals Convention. The majority of the ATCPs, including the U.S., expressed continued support for the minerals convention and considered it as a key element in comprehensive measures for the protection of the Antarctic environment. (Seventeen of the twenty-five ATCPs have signed the Antarctic Minerals Convention.)

Second, the majority of the ATCPs, including the U.S., expressed support for the already extensive network of environmental protection which has been developed within the Antarctic Treaty system. This system comprises agreed recommendations under the Antarctic Treaty, including the Agreed Measures for the Conservation of Antarctic Fauna and

Flora; the Convention on the Conservation of Antarctic Seals; and the Convention on the Conservation of Antarctic Marine Living Resources, as well as the Antarctic Minerals Convention.

Third, the Australian-French proposal, as presented, was seen as undercutting the Antarctic Treaty, itself, which has provided a unique and successful international legal mechanism for dealing with activities in Antarctica and for protecting its environment.

In the end, ATCM XV achieved considerable progress on concrete aspects of comprehensive measures (see the summary of the results of ATCM XV above) and reached a consensus on future work on the item. The ATCPs agreed to set as the common objective "the further elaboration, maintenance and implementation of a comprehensive system" for the protection of the Antarctic environment. They agreed on two meetings in 1990 - the first to consider all proposals in relation to the comprehensive and the second to consider all proposals in relation to the liability protocol called for in the Antarctic Minerals Convention.

The United States did not support the Australian-French proposal for a comprehensive convention for the reasons outlined above. The U.S. is committed to a comprehensive system for the protection of the Antarctic environment and therefore fully supports the two recommendations adopted at ATCM XV on this subject. (Copies of the recommendations, as provisionally adopted, are attached). In our view, achieving the objective of a comprehensive system will be best served by identifying and developing the substantive elements of the system and afterwards addressing questions of form (e.g., convention, protocol, or agreed recommendations). It should also be noted, as is reflected in the recommendation of ATCM XV, that achievement of a comprehensive system cannot be viewed as a single event, but will be a process requiring the continuing and concerted effort of the ATCPs.

Q. Is it possible to adopt the Minerals Convention and then later adopt a more extensive, stricter Conservation Convention?

A. Yes. Entry into force of the Antarctic Mineral Convention would not preclude later development by the ATCPs of additional provisions applicable to possible mineral resource activities in Antarctica whether through a convention or otherwise. It should be noted that in order to complete its system of environmental protection the Antarctic Minerals Convention itself calls for the consensus negotiation of a subsequent protocol on liability and bars consideration of any exploration and development activities prior to entry into force of the protocol.

Q. How long would it take to negotiate a Conservation Convention?

A. That question is impossible to answer without making a number of assumptions about the definition and content of a conservation convention. I do not believe that there will be agreement on a convention along the lines of that proposed by Australia and France. On the other hand, I believe that it is possible to make concrete and rapid progress toward a comprehensive system for protection of the Antarctic environment as called for at ATCM XV and as illustrated by the measures adopted at that meeting. This approach recognizes that the question of the form of the comprehensive system (whether an additional convention is necessary) is not the primary issue and that, in fact, achievement of the system should be viewed as a continuous process.

Senator GORE. You talked about cooperation. Has Argentina reimbursed us yet?

Mr. SCULLY. Argentina has not reimbursed us. The question of whether or not, and how we would seek or how we would calculate any such reimbursement is one we still need to study.

Senator GORE. There are at least some deficiencies in the model, then?

Mr. SCULLY. There are quite a number of deficiencies in the model insofar as how to deal with questions of liability in Antarctica, yes, sir.

Senator GORE. Thank you very much for getting us off to a good start. I am going to hold off on questions until the other three witnesses have completed their statements.

Dr. Peter Wilkniss is Director of the Division of Polar Programs with the National Science Foundation and was a good host on the trip that Senator Hollings and I made along with some others. It certainly is good to see you again, Dr. Wilkniss. Please proceed with your statement.

**STATEMENT OF DR. PETER E. WILKNISS, DIVISION DIRECTOR,
DIVISION OF POLAR PROGRAMS, NATIONAL SCIENCE FOUNDATION**

Dr. WILKNISS. Thank you, Mr. Chairman, for your kind words. With your permission I would like to underline some of the points in my summary with viewgraphs.

Senator GORE. All right. I am going to move over there, closer to the screen.

Dr. WILKNISS. The Antarctic was totally devoid of human presence until it was discovered and its exploration began some 150 years ago. This fact and its geographical location are two major considerations in understanding the unique and fragile environment of this vast, ice-covered continent.

In examining environmental problems caused by increasing human activity in the Antarctic, the following observations apply:

Any human intrusion and accompanying means of life support alter the pristine nature of the local environment.

Current human activity is focused in the most hospitable coastal areas because of existing ice and snow-free ground and ice-free navigable waters.

The dry, cold desert climate of the Antarctic preserves debris of human physical occupation for centuries.

The Antarctic terrestrial environment is virtually devoid of microbial activity. Decomposition of degradable organic waste is slow, or virtually absent, and entrapment in ice or snow of waste matter significantly increases the persistence, over time, of discarded matter.

Since the race to the South Pole at the beginning of this century, human activity has increased almost exponentially, doubling about every 30 years—every human generation—and it also has expanded from expeditionary visits to year-round occupation of town-like settlements.

I would like to illustrate the impact of the U.S. Antarctic program using the example of McMurdo that the Chairman has cited.

It is our main hub in sustaining all of our activities on the continent, especially our lifeline to Amundsen Scott South Pole stations. [Viewgraph.]

Dr. WILKNISS. This is for orientation of our problem areas. Mr. Chairman, you see on the lower left our harbor, Winter Quarters Bay, the waste water outfall next to it, on the left the old dump and then further up in the viewgraph, not identified, Fortress Rocks, where burning and landfill operations are taking place.

Senator GORE. Now, just for the record, the reason McMurdo base is where it is, is that this is the closest point to the center of the continent where the ocean remains navigable for at least part of the year?

Dr. WILKNISS. That is correct, Mr. Chairman. That is why it was picked by the heroic explorers. It allows the closest approach to the South Pole by ship in the summer, when the ice breaks out of the Ross Sea and McMurdo Sound.

Senator GORE. The hut from one of the first of the heroic explorers is still right above where you have written "ice wharf", on that small peninsula, correct?

Dr. WILKNISS. That is correct, Mr. Chairman. The 1903 hut, from Scott's first expedition, is located there.

Senator GORE. So the main U.S. base is located adjacent to the first place where the early explorers came when they came to this part of the continent?

Dr. WILKNISS. That is correct.

Senator GORE. All right, go ahead. Excuse me.

Dr. WILKNISS. Let me magnify some of the problems that have been pointed out in a number of discussions and in the media. The next viewgraph shows you a view of the old dump.

[Viewgraph.]

Dr. WILKNISS. There is still existing a sewage outfall.

[Viewgraph.]

Dr. WILKNISS. The next view focuses on the Fortress Rocks area. It shows what happens when an open burn is conducted and creates smoke and particles that of course are carried away from that site. You see the accumulation of waste at this point.

During the 30 years of existence, McMurdo has evolved into the largest permanent settlement in Antarctica, with a summer population of 1,100, and all attached problems of a small town waste management situation.

It is clear that practices that were acceptable 30 years ago cannot be tolerated—in fact, are no longer in full compliance with evolving laws and regulations and have to be dealt with in a decisive and timely fashion.

The second example that I would like to present on Antarctic environmental impact is that of the accident of the Argentine ship *Bahia Paraiso* that you mentioned in your opening statement, Mr. Chairman.

May I have the last viewgraph, please?

[Viewgraph.]

Dr. WILKNISS. This shows the present situation of the ship. You can see it in almost exactly that fashion from our research station, Palmer, in the peninsula.

Palmer was heavily impacted by this accident; first of all the research activities, and then by a number of problems following the sinking.

First of all, the rescue of more than 300 people, then a significant oil spill, and then a difficult and complex international attempt to deal with the protection and clean-up of the local environment and to deal with the aftermath of this shipwreck.

No acceptable solution to this problem is yet in sight. In looking at the most pressing environmental problems in the Antarctic from the point of view of our Antarctic program, I would like to summarize as follows:

We have to prevent the further spread of environmental impacts by our program, bringing present operations into agreement with current regulations, attitudes and technology.

We have to clean up debris from past operations and we have to elevate the whole approach to Antarctic operations to a higher level of environmental consciousness and technological program performance.

In order to achieve these ambitious goals in a meaningful and timely fashion, the President's fiscal year 1990 Budget Request to the Congress for the U.S. Antarctic program includes a five-year safety, environment, and health initiative, earmarking 30 million dollars in this period to deal with the environmental problems.

We are confident that the appropriation of these resources by the Congress will enable the Antarctic program to successfully achieve needed improvements.

Our second problem from the *Bahia Paraiso* sinking is more difficult to deal with. It falls into the international realm of the Antarctic Treaty nations.

The *Bahia Paraiso* is still owned by the Argentine Government. It rests in international waters claimed by Argentina, Chile and the United Kingdom, and is affecting the research station investment of a fourth nation, the United States.

The establishing of appropriate safety regulations, bonding and insurance measures and joint resources for prevention and clean-up of oil spill and attendant aftermath will have to be accomplished through appropriate actions under the Antarctic Treaty system. We are actively pursuing this through a number of mechanisms.

Thank you, Mr. Chairman. I will be pleased to respond to your questions.

[The statement and questions and answers follow:]

STATEMENT OF DR. PETER E. WILKINISS
DIRECTOR DIVISION OF POLAR PROGRAMS, NATIONAL SCIENCE FOUNDATION
BEFORE THE SUBCOMMITTEE ON SCIENCE, TECHNOLOGY AND SPACE
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION
U.S. SENATE
SEPTEMBER 8, 1989

Thank you, Mr. Chairman, for the opportunity to discuss with this committee the environmental impact of the U.S. Antarctic Program (USAP). I very much appreciate it.

As you know the program supports national goals in the Antarctic: to maintain the Antarctic Treaty, to ensure that the continent continues to be used only for peaceful purposes, to foster cooperative research contributing to the solution of regional and world-wide problems, and to ensure the equitable and wise use of living and nonliving resources.

As Mr. Scully has stated, the United States has provided the leadership to establish the Antarctic treaty system. Every president since President Eisenhower has reaffirmed the need for the United States to play an influential and active role on that continent.

Since 1971 the Foundation has been assigned the primary agency role to carry out the U.S. Antarctic Program. In 1982 the President affirmed that the Foundation should manage and budget the entire Antarctic program as one single package maximizing cost effectiveness. The Department of Defense through the Navy, and the Department of Transportation through the Coast Guard, have been requested to provide operational support on a reimbursable basis.

Over the past several years the Director of the Foundation, the National Science Board, and the USAP Safety Review Panel have given increasing attention to the environmental impact which has resulted from carrying out that active and influential U.S. presence mandated by the President.

We have reviewed our commitment to protect and preserve the unique, fragile and pristine conditions that characterize the Antarctic continent.

In the 1989 annual message to winterovers, President Bush said,

Enduring the isolation and rigors of these cold, dark months, you are contributing enormously to some of the world's most important scientific research. Antarctica plays an essential role in maintaining the earth's delicate environmental balance. Your studies of this vast region will help us to understand more fully the processes that sustain life around the globe.

The United States is committed to preserving this unique natural laboratory and invites all nations to join us in this effort. I have asked the United States Congress to support a special Antarctic initiative that will effectively address global environmental concerns. I'm confident that nations can work together on environmental matters.

Guided by a National Science Board Report, by the Report of the U.S. Antarctic Safety Panel and by our Environmental Protection Agenda, we are

cleaning up debris from past Antarctic expeditions and bringing operations there into concert with present environmental laws, regulations and international agreements.

A major, multi-year Safety, Environment, and Health initiative is contained in the President's FY 1990 Budget. A comprehensive approach to improvements in these areas is necessary in order to deal with the significant problems which have accumulated. The goals of the initiative are:

- o Safety: to achieve year-round operations in the Antarctic with modern technology and acceptable risk;
- o Environment: to clean up the debris of past operations, and to bring present operations into agreement with current regulations, prevailing attitudes, and current technology;
- o Health: to improve medical facilities and to provide field parties with safety experts who have medical training.

While the U.S. Antarctic Program has attempted to deal with problems in these areas in the past, resources have been inadequate, and a number of serious problems exist, including waste disposal, environmental monitoring, communications, and emergency facilities.

Environmentally, 1988 was an important year for the U. S. Antarctic Program. . The National Science Foundation Director led a Congressional Delegation on an antarctic oversight visit that emphasized environmental issues and concerns. We also began a review of the applicability of all U.S. environmental legislation to our operations in Antarctica.

At the end of August 1988, USAP released its Environmental Protection Agenda, an explicit statement of what environment-related actions had been taken in the past, what it was doing in that area at the present time, and what it planned to do in the future. The Agenda is intended to be a dynamic document rather than a static one, with regular updates about every 18 months. The Agenda now stands as the backbone of USAP's antarctic environmental policy, as guided by relevant U.S. environmental legislation and Executive Orders, the Antarctic Treaty and its provisions, and good environmental stewardship.

In addition to long-term guidance in the Agenda, many actions are underway. This year at McMurdo Station there was evidence of an expanded awareness about, and commitment to protecting the environment. Over 20 energy-inefficient, unsafe, unsightly buildings have been removed from the McMurdo landscape and the utilities distribution system continues to be improved to the benefit of safety, efficiency and aesthetics. There has been improved organization and clean up of outdoor storage areas as well as landscaping of the old snow dump overlooking Winter Quarters Bay. We have achieved better

handling and documentation of hazardous waste management while continuing to return these wastes to the U.S. Also, there was a precedent-setting and environmentally sound fuel offload at Marble Point's helicopter refueling facility by a U.S. Coast Guard icebreaker.

During February 1989 the U.S. conducted an inspection of other countries' stations as provided under the Antarctic Treaty. Members of the Inspection Team, from the National Science Foundation, the Department of State, the Arms Control and Disarmament Agency, and the National Oceanic and Atmospheric Administration, visited Scott Base (New Zealand), Terra Nova Station (Italy), Gondwana (West Germany), Leningradskaya (USSR) and Dumont D'Urville (France). They reviewed on-site science projects and facilities operation and appraised environmental protection efforts at these stations. Significantly, the inspection included visits to selected Sites of Special Scientific Interest, Specially Protected Areas and Historic Monuments to determine their status. During the inspection, the Team observed the continued progress in closing out old Hallett Station, a former U.S. - New Zealand base. Prior to the inspection the U.S. Coast Guard collected and returned old petroleum products left at the station.

The Program is proud of its rapid emergency and environmental study response after the grounding of the Argentine supply and tourist ship BAHIA PARAISO near Palmer Station. Continuing effects from the grounding and resultant oil spill as yet threaten over 20 years of important scientific study that has been accomplished at Palmer Station. The Program's early measurement of the

environmental effects of the oil spill provides a good picture of the significant impacts of the incident that would not have been noticeable if the study had been delayed.

On February 7, 1989, the Director of the National Science Foundation and staff of the Division of Polar Programs began a series of meetings with environmental organizations to keep them abreast of USAP's progress in overcoming environmental problems. The next meeting is scheduled for September 15, 1989, and will feature special reports by researchers involved in antarctic environmental monitoring studies.

The National Science Foundation Director and the National Science Board recognize and accept overall responsibility for the U.S. Antarctic Program as well as the need for increased direct management of it. With that in mind, in late May 1989, the Foundation selected a Safety, Environment and Health Officer who reports directly to me, and the Head of the Safety, Environment and Health Implementation Team who reports to the Manager of our Polar Operations Section. Position Vacancy Announcements for an Environmental Officer, an Environmental Engineer, and an Operations Research Analyst are in the process of being filled, rounding out our environmental protection and management team.

Significant progress has occurred in Environmental Monitoring tasks called for in the Agenda and in response to legislative mandates and responsible antarctic stewardship:

- o The first comprehensive Drinking Water and Wastewater Sampling Programs have been completed. Results indicate that although somewhat acidic, drinking water at McMurdo and Amundsen-Scott Stations and at Williams Field meets U.S. Drinking Water Standards.

In two samplings of domestic wastewater effluent at McMurdo, no unusual or harmful levels of trace metals or organic substances were found to be entering McMurdo Sound.

- o Visual observations and environmental sampling by Dr. John Oliver and colleagues at Winter Quarters Bay evidence a high but extremely small localized impact from solid and chemical wastes existing from past dumping practices.
- o Characterization of hydrocarbons and polychlorinated biphenyls (PCBs) in Winter Quarters Bay by Dr. Robert Risebrough shows that levels of PCBs approach a level of about one part per billion while levels of hydrocarbons range between 5 and 2000 parts per million. This suggests that the PCBs exist at levels that should cause neither human health nor environmental concern. The hydrocarbons are, however, present at harmful levels in small areas of the Bay. Their effects are limited to these areas.
- o Dr. Mahlon Kennicutt has identified the types and distribution of

petroleum products arising from the BAHIA PARAISO incident at Palmer Station.

- o The studies mentioned above will be discussed at an Environmental Monitoring Workshop to be held between September 14-15, 1989. About 15 members of the environmental sciences community will meet to discuss the types of environmental measurements needed to structure a reliable antarctic environmental measurements database as well as what parts of Antarctica require priority study.
- o The results of the abovementioned studies and the guidance received from participants at the workshop will be published in the open literature. Scientists mentioned above will participate in the September 15, 1989, briefing to environmental organizations.

This summer, the Foundation initiated an Interagency Agreement with Oak Ridge National Laboratory's Integrated Analysis and Assessment Section (IAAS) for update of USAP's 1980 Programmatic Impact Statement, and to conduct other environmental assessment tasks. The IAAS is recognized worldwide as a leader in this field. The Division of Polar Programs began, in-house, preparation of environmental impact assessments in anticipation of initiating primary treatment (that is, maceration and dilution before discharge) of domestic wastewater at McMurdo and Palmer Stations.

My final example of environment-related progress concerns our development, along with the U.S. Park Service, of an Antarctic Peninsula/Palmer Station video program to educate, and to increase the environmental awareness of, USAP participants and antarctic tourists alike.

I now focus on findings from the legal compliance review: As a key step toward achieving the environmental goal of the President's FY 1990 budget initiative, our Office of the General Counsel (OGC) has reviewed Environmental Compliance of Antarctic Operations.

First, OGC determined which laws apply to the Antarctic; second, they measured USAP activities against applicable laws to determine if NSF is in compliance; and finally, they are developing recommended actions to bring NSF into full compliance with laws and sound principles of pollution control, wildlife conservation, and waste management.

The review found that most environmental laws administered by EPA do not apply because the Supreme Court assumes statutes apply only in United States unless Congress clearly states otherwise to overcome that presumption. Nevertheless, USAP continues to abide by the spirit and principles of U.S. environmental protection legislation.

The primary pollution control laws that do apply to Antarctica are:

- the Antarctic Treaty

- various international accords under the treaty
- the Antarctic Conservation Act
- Ocean Dumping Act
- Executive Orders on Pollution and Environmental Assessment.

The primary wildlife conservation laws that apply in Antarctica are:

- Antarctic Treaty
- international accords under the treaty (agreed measures)
- the Antarctic Conservation Act and NSF's regulations
- the Antarctic Marine Living Resources Convention Act
- the Endangered Species Act
- the Marine Mammal Act
- the Migratory Bird Treaty Act

The review concluded that stations are generally in compliance with applicable pollution control laws. However, Palmer Station requires additional measures with respect to wastewater treatment and McMurdo with respect to wastewater and solid waste disposal.

It further concluded that NSF is essentially in full compliance with the Antarctic Conservation Act and its Regulations (with the exception of having identified, and set up a permitting process for antarctic pollutants) and other conservation treaties and laws.

The review recommended five sets of corrective actions. Capital improvements recommended included:

- install primary wastewater treatment at coastal stations
- design and install incinerator at McMurdo Station
- build containment berms and obtain other oil spill prevention equipment.

The focuses of cleanup activities recommended include abandoned stations and sites and study of the feasibility of cleanup in Winter Quarters Bay.

Operational improvements at stations recommended include:

- segregation of waste before disposal or discharge
- increased reliance on retrograding hazardous and solid waste
- vigilant attention paid to proper handling and disposal of toxic and hazardous substances
- continued ban on ice-staging and ocean dumping without permit
- proper labelling and storage of all wastes
- restricting amounts of persistent substances and hazardous or harmful materials taken to Antarctica.

Regulatory action and implementation recommended include:

- promulgate pollution control and permit regulations under the Antarctic Conservation Act
- promulgate environmental impact assessment regulations
- implement permit program for discharge of pollutants
- prepare environmental assessments of major federal actions
- implement SEH compliance and enforcement programs
- meet reporting requirements under treaty and other laws.

Plans, studies, and monitoring recommended include:

- design cradle-to-grave waste management plan for McMurdo which incorporate Resource Conservation and Recovery Act and Scientific Committee for Antarctic Research recommendations for waste handling
- study feasibility of full cleanup of Winter Quarters Bay
- test sediment at old Winter Quarters Bay landfill for contaminants and decide if additional action is necessary
- monitor air emissions from incinerator and study impact of other emissions on air quality and land deposition at McMurdo
- analyze wastewater discharge periodically to insure that chemicals and other wastes are not improperly placed in system
- test drinking water for compliance with health standards
- conduct environmental assessments as necessary and appropriate
- conduct soil sampling to detect "hot spots" for cleanup.

With the improvements already made at U.S. stations, the environmental portion of the SEH initiative, and new staff responsible for overseeing and implementing environmental improvements, we believe we are approaching these problems constructively and methodically. We are hopeful Congress will provide the resources to fully implement the President's Antarctic environmental initiative.

RESPONSES TO

SENATOR GORE's FOLLOW-UP QUESTIONS FOR DR. WILKINSS

The Antarctic Treaty provides for the free and open sharing of scientific data.

Question: How does the free and open sharing of scientific data work in practice?

Response: At present, there is a wide spectrum of data sharing practices employed by U.S. antarctic researchers. Investigators supported by individual research grants are not obligated to make data available prior to publication. Investigators approached by a potential collaborator to share or compare data sets for joint research usually respond positively.

Question: Do researchers share their data while the experiments are in progress? Or do they wait until they have published their results?

Response: Usually researchers share their data during an experiment with all members of their research team including foreign participants. Sometimes, depending upon the nature of the research, data may be shared with another scientist working in a similar area of research in order to mutually enhance both projects. The usual case, though, is that data is not shared beyond the scientist, or scientific team, doing the research until it is published in the open literature.

Question: Is the situation different for global change research?

Response: Coordinated multidisciplinary research programs require rapid availability of data from all participants for the success of the program. Global change research fits into this category. The National Science Foundation has funded several large-scale interdisciplinary programs including some that were international. Multi-investigator research is scheduled for this current austral summer and many more programs are being planned for future years. Difficulties in data sharing are not expected.

Question: Do you think it would be useful to find new mechanisms for sharing data?

Response: Gaining access to research results (especially seismic and other geophysical data) acquired by researchers from other nations working in Antarctica has presented some difficulties. At present, the United States Antarctic Program has been the only national program that has provided free and open sharing of scientific data. NSF program staff are currently employing a variety of techniques to increase the availability of other nations' scientific data. One of the most successful techniques has been our willingness to openly share U.S. data. Another technique instituted by NSF is to insist on a free-exchange-of-data clause in any international effort in which we participate in Antarctica.

Question: What mechanisms might be developed?

Response: At this point in time, mechanisms to ensure compliance with existing Treaty Articles and Recommendations including the sharing of data, are lacking. Each nation must police itself as there is no international enforcement mechanism under the Antarctic Treaty. The United States has taken the approach of leading by example and, through proper diplomatic and other channels, urging other nations to follow this example.

The Antarctic Treaty System contains a broad range of environmental protection measures. Yet enforcement of those measures varies since each nation is responsible for enforcing them on their own nationals. Some nations devote more resources and effort to enforcement than others.

- Under the Antarctic Conservation Act of 1978, NSF has responsibility for enforcing a number of environmental regulations. Among other things, NSF is to protect the Specially Protected Areas set up under the Agreed Measures of Flora and Fauna and the sites of Special Scientific Interest.

Question: How does that work in practice?

Response: Each year, the Division of Polar Programs receives proposals to conduct scientific research on the Antarctic Continent. Proposers are provided with a special antarctic proposal preparation kit. This kit, which contains a full copy of the Antarctic Conservation Act (ACA), alerts proposers to the fact that if they need to enter a Specially Protected Area or a Site of Special Scientific Interest, they must submit an application for a permit to enter such areas. Then, proposals are reviewed for their scientific merit and logistic feasibility. If a proposal is awarded, any permit applications are then subjected to review by the appropriate Polar Science Section Program Manager and the Head of that section to assure a science-based need to enter as well as adherence to ACA provisions. Copies of awarded proposals and approved permits are forwarded to the NSF Representative on station. The grantee (or the grantee's agent) is required to carry the approved permit on all trips into the specified area. At the conclusion of the research, grantees are required to provide the NSF with a report about their entrance into the area. This report includes statements about the environmental status of the area entered.

Question: Has anyone ever been fined for trespassing in a penguin breeding area or other environmentally sensitive areas?

Response: No individual U.S. citizens have been fined. One individual, a non-U.S. citizen, was censured by his host university after the NSF informed the university that he had transported a penguin skin from the Antarctic.

Several individuals have received reprimands for technical violations of the NSF regulations but no fines have been levied yet.

Question: What about the other regulations NSF is responsible for enforcing?

Response: The NSF is responsible for enforcing regulations under the ACA concerning:

- o taking any native mammal or bird;
- o collecting native plants;
- o possession and transfer of native mammals, plants or birds;
- o import into or export from the U.S. of native mammals, plants or birds;
- o introduction of non-indigenous animals and plants into Antarctica;

Question: How much effort is devoted to enforcement? Who is responsible?

Response: Enforcement is a collateral duty of each NSF Representative on station, but requires only a small fraction of their time. Twenty percent of an NSF staff member's time is spent in the review and issuance of permits.

Question: Is it likely that NSF would be called upon to help enforce the Convention?

Response: We do not believe that NSF would be expected to enforce the Convention. This would most likely be done through the Convention's Secretariat as part of the Antarctic Treaty System. Scientific research or monitoring knowledge developed under NSF grants would, however, constitute a valuable subset of information that would be applicable in enforcing the Convention.

Question: What kind of impact would that have on NSF?

Response: If NSF were called upon to help enforce the Convention, it could have a major impact on the Foundation, especially in management and resource allocations for the U.S. Antarctic Program.

Senator GORE. Thank you very much, Dr. Wilkniss.

Let me interject one brief question. To illustrate the seriousness of the damage done by the *Bahia Paraiso* spill, I will ask you to comment on my understanding of what occurred.

One of the most important research projects in the Antarctic has been an effort to determine the effect of increased ultraviolet radiation due to stratospheric ozone depletion on those small creatures at the base of the food chain, the smallest of the plankton—the phytoplankton and nannoplankton and picoplankton.

The only project of that kind in the world was underway off Palmer Station and had reached the stage where three years of base data had been compiled, and the area under study was destroyed, for all intents and purposes where the plankton are concerned, by the spill. Is that an accurate statement?

Dr. WILKNISS. Yes, Mr. Chairman. I agree with you fully. The problem is that this is a totally new frontier of research and we still have gaps in understanding the plankton community that you talk about. With a major oil spill, or a significant oil spill, not major in proportion to other oil spills, and the continuing impact—the ship is still slowly leaking oil—I think no peer reviewed journal would accept research results that cannot distinguish between this man-made impact and the impact of the ozone hole through increased UV on this oceanic population.

Senator GORE. Well, it sounds a little arcane and obscure, but actually the effect of increased ultraviolet flux on the food chain could rapidly become one of the most serious questions humankind has ever faced and to have only one study underway and to have that study wiped out by this environmental catastrophe is an extremely significant matter.

Of course, the *Valdez* accident quite properly got a lot of attention and concern, but Antarctica is remote in many ways—remote from our thinking as well as difficult to reach geographically, but we should not be lulled by that fact into thinking what happened there was not extremely serious. It was.

Anyway, we will come back to that also. Our next witness is Lee Kimball, director of the Antarctica program at the World Resources Institute and one of the leading experts on Antarctic policy anywhere in the world, and we are delighted to have you here Miss Kimball. Please proceed.

STATEMENT OF LEE KIMBALL, DIRECTOR, ANTARCTICA PROGRAM, WORLD RESOURCES INSTITUTE

Ms. KIMBALL. Thank you, Mr. Chairman.

I have two jobs. I work for the World Resources Institute on Antarctica.

Senator GORE. Well, we have them both down, so you are covered.

Ms. KIMBALL. In my testimony I would like to address two aspects of environmental issues in Antarctica: those with respect to the U.S. program and environmental issues as they are dealt with in the international treaty system.

With respect to the U.S. program, you had asked particularly that I look at the science, environment and health initiative that

Peter Wilkniss has described, that the foundation is seeking funding for. I totally support that initiative. We have already seen quite a bit about the environmental problems that need to be dealt with. I think the Science Foundation, in the last three years, has made an effort to clean up its program activities in Antarctica and is beginning to take a new approach to avoiding environmental damage in Antarctica from its activities.

Also, more recently, the general counsel's office has identified areas where the U.S. program is not in compliance with international and domestic law and they are now seeking to remedy this.

Having said that, I find that the documentation supporting the initiative, particularly the agenda and the strategy for compliance with environmental laws, are somewhat lacking in clarity as to what are the priorities and what is an agreed schedule for carrying out the activities identified in them. And I would strongly encourage this committee to give some guidance to the Science Foundation as it implements that program.

In my view, NSF should proceed immediately on two fronts, both the legal requirements and the operational activities described in that program initiative. For without the legal basis and the related sanctions, whatever the operational improvements, there would be no teeth to back up their application in the program or to enforce them.

Therefore, the first legal priority, in my view, should be promulgation of regulations to implement a broadly construed pollution control program, pursuant to the 1978 Antarctic Conservation Act, as referred to in more detail in my testimony.

Enacting regulations under U.S. law would not only allow us to apply and enforce that law, with respect to the U.S. program itself, but also with respect to all U.S. citizens in Antarctica, including tour groups organized under U.S. law.

The second priority should be completion, as soon as possible, of a revised programmatic environmental impact statement for the U.S. program and a review of all U.S. program activities to ensure that they are consistent with this revised document.

Third, NSF should issue without delay regulations to implement Executive Order 12114, which governs the extraterritorial application of environmental impact assessment to U.S. program activities. And these regulations, in my view, should also incorporate a regular audit of U.S. program activities.

On the operational side there are two issues that I think should have immediate priority. One is the design, funding and implementation of environmental studies and monitoring programs in Antarctica to support sound environmental management there.

And the second is the need to agree on priorities among the various actions contemplated in the NSF documents for improved waste management. And here I have identified several in my testimony.

Also, with respect to the NSF initiative, I think the NSF should establish a procedure for regular consultation with organizations in the implementation and determination of priorities, pursuant to this initiative and in the overall conduct of the U.S. program.

Let me stress again the importance of NSF acting on both these fronts, the legal and the operational. A major weakness of the Ant-

arctic Treaty, as it has evolved, is the extent to which measures adopted pursuant to it, the recommendations, are in fact legally binding and enforceable. The U.S. program represents the United States in Antarctica. It should provide a model for environmentally sound operation there. If the U.S. does not apply, in a legally enforceable manner and give effect to these regulations in its own operations, we are not in a good position to urge other nations to do the same in Antarctica.

This brings me to the international measures aspect of environmental protection in Antarctica, where, again, there are two aspects of the issue I would like to consider. One is the adequacy of existing measures—where they need to be upgraded and supplemented. The second is compliance and the enforceability of measures that presently exist.

Mr. Scully reviewed the existing measures that have been adopted under the Antarctic Treaty. I would like to concentrate on priorities for the 15th consultative meeting in Paris in October.

In my view, the first priority should be adoption of this improved waste management code, that has been referred to by yourself and by the other speakers, and to ensure that these obligations are enforceable.

Second, to agree on a variety of marine pollution control measures and response capabilities, and to begin addressing liability for marine pollution control. And here the United States has developed a major initiative that I am totally in support of. We also need to look at improving charting and weather prediction capabilities to avoid air and vessel accidents in the future.

Third, we need to agree on monitoring programs that should be carried out by all states in relation to their activities in Antarctica: initially, in the narrower sense of monitoring national program impacts, with each nation monitoring its own program impacts on waste or disturbance of wildlife; and over the longer term, to explore development of an integrated monitoring program to collect baseline data against which changes in local environments and global environments may be measured and to help identify their causes. And these should include support for adequate data management systems.

Fourth, we need to expand the protected area system in Antarctica and to extend its coverage to wider areas of the continent.

And fifth, in respect of tourism, to develop better handles to avoid adverse impacts, combining an up-front educational and awareness-building program, backed up by enforceable requirements and reporting procedures.

Turning to consideration of compliance and enforcement of measures applicable in Antarctica at the international meeting in Paris, as I mentioned earlier, I think the most important aspect is enforceable obligations for waste management in Antarctica.

Second, I strongly believe we should use the Paris consultative meeting as a forum to collectively review state practice in Antarctica and call attention to deficiencies. This is a matter that is usually approached somewhat warily by the Antarctic Treaty parties. I think we need to spend more time at our meetings using them as a forum for reviewing state practice and calling attention to problems.

We have a number of opportunities in Paris to do so. One is the protected areas review, where all states have been looking at how well the existing protected areas are being complied with and how well their objectives are being met.

We also have an opportunity to review a number of more detailed inspection reports, where problems have been identified, such as introduction of non-indigenous species through non-sterile soil, containment of fuel storage, and waste disposal.

Third, we have an opportunity to review state practice in implementing environmental impact assessments under a recommendation adopted two years ago. And here I think there are two important points that should be borne in mind. One is the need to identify more specific criteria and procedures as guidance for states in implementing environmental impact assessment; and the second is discussing follow-up to environmental impact assessment.

And here I think a recent Greenpeace report on its visit to Dumont d'Urville, the French station where the airstrip is being constructed, indicates what would be a relatively egregious lack of attention to whether actions the French have taken to mitigate adverse impacts are indeed successful.

The third issue on the consultative meeting agenda that relates to compliance is the issue of the secretariat. The infrastructure that a secretariat could provide under the Antarctic Treaty would be to help serve as a basis for communications, such as in emergency situations like the Bahia Paraiso oil spill, or to serve as an early warning system in identifying potential problems, such as cumulative impacts or non-compliance with Antarctic Treaty measures.

Now this brings me finally to the issue of comprehensive environmental measures that Tucker Scully addressed. He outlined the elements of that: strengthening the existing measures, gaps, integration, compliance, and the monitoring program, all of which I fully endorse. There are just three points I would like to leave you with in relation to this comprehensive measures initiative.

When you look at the compliance element, its most important aspect is the form of measures adopted: is the measure legally enforceable and how do we ensure that? We should also look at expeditious procedures through which we can update measures, in light of new environmental information or new technologies. We also need to look at improved information flow on state practice and the development of means for collective review and fact-finding procedures when questions of compliance do arise.

But most fundamentally, discussion of this highly visible agenda item, comprehensive measures, should not be allowed to impede action on the number of more specific issues on the agenda that I have already discussed.

Thank you.

[The statement and questions and answers follow:]

Statement of Lee A. Kimball
Director, The Antarctica Program
World Resources Institute

Mr. Chairman and members of the subcommittee:

Thank you for the opportunity to appear before you to discuss environmental problems arising from increasing human activity in Antarctica. Your initiative comes at a critical moment when the nations active in Antarctica are faced with reassessing long-standing practices and making a commitment to avoid future environmental damage in Antarctica. They must not only remedy the consequences of past practices but re-orient their activities to anticipate and provide for the protection of Antarctica and the central role it plays in global Earth systems.

In my testimony today you asked that I consider the uniqueness of Antarctica, pressing environmental problems

there, and what is being done to address them. I will do so in relation to:

- * the need for the United States Antarctic Program (USAP) to clean up the results of past practice and immediately install a new regime for environmental protection as a model for other nations to follow, in particular the NSF's new Safety/Environment/Health initiative, as requested, and
- * requirements for collective decision-making by all nations active in Antarctica to prevent and alleviate environmental problems in the region.

Two primary issues arise in this context:

- (1) the adequacy of environmental protection measures applicable to Antarctic activities; and
- (2) compliance with them.

BACKGROUND

The Uniqueness of Antarctica

You asked me to address why Antarctica is so unique and fragile. Having once visited, I can tell you that it is uniquely beautiful as a virtually untouched glacial expanse, teeming with marine life and birds in coastal areas.

Second, it provides a unique scientific laboratory for research critical to understanding global Earth processes and our changing environment. For example, Antarctica's relatively pristine environment, well removed from most sources of pollution, serves as an early warning system for detecting the impacts of natural phenomena and human activities worldwide. Measurements taken there provide baseline data to monitor long-term global changes -- most dramatically in relation to the

ozone hole over Antarctica, but also in relation to acid rain and the accumulation of carbon dioxide. At the same time, Antarctic ice cores yield historic records of atmospheric change going back millions of years. Study of the movement of cold Antarctic waters is fundamental to understanding oceanic circulation and heat balances between the oceans and the atmosphere, while relatively uncomplicated terrestrial ecosystems form a testing ground for ecological and evolutionary hypotheses and the development of models that may be applied in helping to understand other, more complicated systems.

Third, Antarctica's unique system of governance breaks new ground in demilitarizing 10% of the Earth's surface and laying aside conflicting claims to provide for freedom of scientific research. It is critical to understand the complex legal and political foundation for the Antarctic Treaty System (ATS) if one seeks to alter practices there. Yet despite its complications, the ATS represents a strikingly successful example of multilateral cooperation.

Environmental Problems in Antarctica

My testimony will not go into detail on the current environmental stresses in Antarctica. They are well covered in a variety of recent documents.

In general, during the last decade, the number of countries conducting research in Antarctica and operating bases there has doubled. Tourism has intensified even more dramatically and is likely to

continue to do so. This increase in human activity expands requirements for supplies and energy and the corresponding volume of wastes to be disposed of, compounds disturbance of wildlife and subjects an ever-greater segment of the continent to human impacts, and multiplies the risks of accidents such as the recent Bahia Paraiso oilspill near the US Palmer research station. Impacts are concentrated in the most accessible coastal and nearshore areas -- the same areas favored by naturally-occurring species. At the same time, the lure of potential Antarctic resources has led to increasing harvests of marine living resources in the Southern Ocean and raised the possibility of minerals development on the continent and its offshore areas, with attendant logistic support operations. The possibility of minerals development in Antarctica suggests environmental damage orders of magnitude greater than those caused by activities already carried out there.

The treaties governing Antarctic activities are:

- The 1959 Antarctic Treaty, with respect to science and tourism.

- the 1972 Convention for the Conservation of Antarctic Seals (CCAS), although there is presently no commercial sealing in Antarctica.

- The 1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), with respect to marine living resources harvesting. US citizens are not presently involved in harvesting marine living resources. If they commenced, they would be subject to the 1984 Antarctic Marine Living Resources Convention Act.

- In 1988 the parties to the Antarctic Treaty concluded a Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA) to govern the possibility of mineral resources development. The US signed CRAMRA on November 30,

1988. The treaty has not yet been submitted to the Senate for ratification, and implementing legislation will be required.

As Antarctica has emerged from its frozen isolation into the public eye during the last decade, public interest organizations concerned about degradation of this last great unspoiled frontier have played a major role in calling attention to environmental practices that are increasingly lax by today's standards. Greenpeace International deserves particular credit for having established an independent watchdog operation, with its base in Antarctica and visits to research stations to review and photograph practices there. The continent's relative inaccessibility makes it extremely difficult otherwise to receive independent reports on the actual conduct of activities in Antarctica. These and other reports have focused particularly on waste disposal practices and disturbance of wildlife caused by construction, recreation, and tourism.

THE MANAGEMENT OF ANTARCTICA

The US Antarctic Program

Mr. Chairman, three years ago the National Science Board conducted a review of NSF's role in polar regions and recommended that health, safety, and environmental protection practices be upgraded, particularly in the Antarctic. NSF then commissioned a panel of experts, whose 1988 Safety in Antarctica report includes recommendations to improve US operations in accident prevention, environmental protection, and energy use. In a separate action, the Division of Polar

Programs initiated in April 1987 development of an Environmental Protection Agenda, released in August 1988 for review and public comment. Among other matters, that agenda recommends the clarification and normalization of legal guidance on environmental matters for all components of the USAP. A draft of this review of domestic and international environmental laws applicable in Antarctica, entitled "A NSF Strategy for Compliance with Environmental Law in Antarctica", was made available for public review and comment in July. It is my understanding that in a revised Agenda currently in progress, the recommendations of the Strategy will prevail. My comments take this into account in discussing the NSF Safety/Environment/Health (S/E/H) initiative.

The NSF is requesting \$10 million in FY1990 as the first increment in a \$180 million, five-year environmental, health and safety initiative for the USAP. Of the FY1990 request, slightly over one-half is slated to remedy environmental deficiencies and improve the environmental soundness of future program activities. This would include accelerated removal of wastes at the former dump site at Winter Quarters Bay near McMurdo Station, and studies to develop a system to minimize and dispose of solid waste with minimal environmental impact. Over the longer term, a variety of clean-up and improved wastes management procedures are contemplated, as well as development of an environmental monitoring program, construction of protective containment around fuel storage facilities, and

equipment to contain and clean up accidental fuel spills on land and at sea.

Mr. Chairman,

in my view the National Science Foundation five-year initiative for environmental protection in Antarctica should be strongly supported. The issue before this Committee is the importance and the urgency of improving environmental protection in US Antarctic operations and establishing priorities for doing so. The S/E/H proposed actions to remedy and upgrade environmental practices in the USAP go a long way toward improving the present situation and, more important, would set in place many elements of a revised regime to anticipate and avoid future stresses. They will cost money. The Strategy produced by NSF indicates the extent to which the USAP has not met requirements under applicable international and domestic law, calls for actions to remedy this situation, and recommends in addition that US practice conform with certain criteria and standards under other US laws technically not applicable.

Nevertheless, the Agenda, the Strategy, and the description of the initiative made available to me do not yet clearly specify priorities or an agreed schedule for implementation, funds permitting, in relation to:

- issuing regulations and procedures called for under the 1978 Antarctic Conservation Act and Executive Order 12114;
- completing an update of the 1980 programmatic

environmental impact statement (EIS) and initiating follow-up studies required;

- implementing improved waste management procedures outlined in the documents and as upgraded under the Antarctic Treaty;

- implementing improved handling of toxic, solid and hazardous materials suggested in the documents and as upgraded under the Antarctic Treaty; and

- implementing monitoring programs as recommended in the documents and pursuant to the Antarctic Treaty.

I would therefore encourage this Committee to provide specific guidance to NSF in its implementation of the S/E/H initiative and to sustain its oversight responsibilities in this regard. Specifically, Mr. Chairman,

* NSF should promulgate without delay regulations pursuant to the ACA, as recommended in the Strategy, to designate harmful pollutants and to prevent or control their discharge or disposal. These regulations should incorporate standards and procedures under applicable international laws, including the wastes handling and disposal recommendations adopted pursuant to the Antarctic Treaty System. In addition, pursuant to the broad mandate of the Act, these regulations should incorporate insofar as possible the standards and principles referred to in the NSF Strategy document, giving effect in the USAP to the policies and principles in such US environmental laws as the Toxic Substances Control Act with respect to handling and disposal of certain wastes; the Resource Conservation and Recovery Act with respect to solid and hazardous wastes handling and disposal requirements; and the Clean Air Act in relation to emission standards for hazardous pollutants and mobile sources and standards for prevention of significant deterioration.

This would not only implement the pollution control program

envisaged in the ACA, it would expand it to apply higher standards appropriate to Antarctic environmental protection. It would also allow the US Government to enforce these regulations vis-à-vis USAP personnel as well as vis-à-vis all US citizens as defined in the Act, including tour operators organized under US law.

- * NSF should complete as soon as possible, as recommended in the Strategy, a revision of the 1980 programmatic Environmental Impact Statement (EIS) on the USAP. It should then carry out a one-time review of program activities to ensure that they are consistent with the revised document.
- * NSF should issue without delay regulations pursuant to Executive Order 12114 providing for assessment of extraterritorial environmental impacts of major Federal actions. These regulations should provide for a regular audit of station practices and compliance with applicable law and regulations, perhaps as part of the biennial, program-wide review contemplated in the Agenda.

These two actions would bring the USAP into compliance with Executive Order 12114 and, combined with effective monitoring programs, serve to implement Antarctic Treaty Recommendation XIV-2 on environmental impact assessment and monitoring.

- * To ensure the continuing soundness of USAP activities, NSF should as a priority design, fund, and implement monitoring studies to identify environmental impacts of its activities, including monitoring of air emissions from wastes incineration and fuel consumption, wastewater discharge, and fuel storage and waste disposal sites, and carry out any follow-up studies required in the revised programmatic EIS. The Agenda recommends that environmental studies and monitoring should be related to USAP management.

This would ensure that assessments are verified and continuously examined to avoid adverse environmental effects and to identify whether additional control measures are

necessary. It would also provide a measure of control to ensure compliance with applicable measures.

* In identifying priorities among the improved waste management procedures contemplated, NSF should be instructed to give priority to:

- ceasing open burning at Fortress Rock landfill, which is contrary to applicable international law, and the immediate installation, as recommended in the Strategy, of an incinerator fitted with appropriate emission controls;

- discontinuing as soon as feasible use of landfills, inconsistent with applicable international law, and establishing minimum time limits for removal of all solid, non-combustible wastes from the Antarctic Treaty area for disposal in conformity with applicable international and domestic law;

- installing macerator units for sewage and other wastewater at McMurdo and Palmer Stations and submerging wastewater outfalls, recommended as a priority in the Strategy;

- initiating a program to inventory materials taken to Antarctica that may become or generate wastes, and to segregate waste materials to avoid burning of plastics and other materials that produce harmful air emissions, while moving ahead on the design of a cradle-to-grave wastes management system as contemplated in the Agenda;

- initiating improved surveillance at stations to ensure compliance with waste disposal and protected areas regulations, for example, to prevent unauthorized dumping of potentially dangerous materials into landfills and improper introduction of chemicals into the wastewater collection system, as referred to in the Strategy.

Finally, Mr. Chairman, NSF should provide that interested organizations are consulted in a regular fashion on implementation and determination of priorities under the Agenda, the Strategy for Compliance, and in general with respect to the environmentally-sound management of the USAP and

the two-year program-wide reviews called for in the Agenda. This would provide the kind of external review and public participation that improves the effectiveness of US laws in their formulation and implementation.

Gaps

There are also certain gaps in the documentation supporting the S/E/H initiative that should be more completely addressed. These include:

(1) Review of applicable measures governing wastes disposal and operational practices of ships and aircraft servicing the USAP, and the execution of any improvements required.

(2) Clarification as to whether additional legal authority is required to ensure compliance with environmental protection measures by all components of the USAP -- NSF personnel, the contractor for the USAP program, and individual researchers funded by NSF as well as US military and Coast Guard personnel.

(3) Provision of clear enforcement authority and requisite funding for enforcement actions to ensure compliance with applicable law and supplementary regulations contemplated in the Strategy. The Agenda calls for environmental officers at US stations, but there is no provision in the NSF initiative to cover on-site enforcement actions, both with respect to USAP and associated personnel and with respect to tour groups subject to US jurisdiction.

(4) The Agenda notes that planning for fuel-related

facilities should provide for containment of spills and incorporate strategies for coping with environmental emergencies. This should be expanded to cover contingency planning and training for any accident response as noted in the Safety in Antarctica report.

(5) The NSF initiative should incorporate, as recommended in the Safety in Antarctica report, analysis of alternative energy sources such as solar and wind energy, the establishment of energy conservation standards, and energy and water conservation plans for USAP stations.

(6) Another matter not explicitly addressed in the NSF documents is measures to avoid the introduction of non-indigenous species into Antarctica through import of non-sterile soil for house plants. A 1989 New Zealand/United Kingdom inspection of Palmer Station notes that soil has been brought into the station for house plants. In light of recent criticism by the international Scientific Committee on Antarctic Research (SCAR), the US should review this practice to ensure against any introduction of non-indigenous species, which is contrary to the Agreed Measures under the Antarctic Treaty.

Mr. Chairman,

the USAP represents the United States in Antarctica. As such, it should provide a model for environmental protection in the region. In turn, this will place the United States in a better

position to advocate adoption at the international level of sound environmental protection measures. Moreover, it is clear that to the extent the USAP or other national Antarctic programs undermine the relatively pristine nature of the Antarctic environment, this diminishes the value of the continent as a laboratory for scientific research of global consequence.

THE MANAGEMENT OF ANTARCTICA

Collective Measures

My testimony will only summarize the environmental initiatives on the agenda of the XV Antarctic Treaty Consultative Meeting (ATCM) in October, since I understand that Mr. Scully will address these matters in more detail.

Since 1983 the ATCMs have undertaken a number of initiatives to better safeguard the Antarctic environment. Most significant in this regard was the adoption in 1987 of Recommendation XIV-2, providing for environmental impact assessment and monitoring or scientific research and logistics activities, and the related issue of potential adverse cumulative effects caused by concentration of stations. Measures taken by states to implement this Recommendation will be discussed in October. Another important milestone is the success -- measured by imitation -- of US initiatives to expand use of inspection under the Antarctic Treaty to explicitly incorporate compliance with environmental protection measures. The US developed a detailed checklist on environmental matters

for its 1989 inspection, and recent New Zealand, United Kingdom and Australians inspections have followed a similar practice.

Three other major items on the XV ATCM agenda stem from studies and initiatives taken during the last six years. These include:

(1) adoption of an improved code governing wastes disposal in Antarctica, as recommended by the international Scientific Committee on Antarctic Research, and ensuring that its stipulations are enforceable.

(2) expanding the coverage of protective arrangements for specific areas of Antarctica, to better safeguard ongoing scientific research, areas of biological importance, sites of outstanding geological, scenic, recreational or wilderness value, and historic sites and monuments. This subject will include consideration of multiple-use protected areas in Antarctica and proposals for their designation.

(3) Measures to avoid environmental damages and wildlife disturbance caused by tourism.

Another item on the ATCM agenda for some time that may finally produce results is a proposal to establish a small, efficient, secretariat under the Antarctic Treaty. This body would expedite and organize the increasing range of issues and communications relevant to matters arising under the Antarctic Treaty. The US has strongly supported this initiative.

A major new initiative proposed by the United States recommends several steps to improve marine pollution control

and response capabilities in Antarctica and to consider liability for pollution damages in Antarctica, including pollution from ships. Other countries have proposed consideration of improved weather and charting services for ships and aircraft to avoid accidents.

Finally, there are a variety of agenda items under which the issue of environmental monitoring will arise in October, and it is my understanding that the United States will support initiatives to adopt ATCM recommendations furthering the development and application of such programs. The subject comes up in relation to monitoring of waste disposal practices, monitoring pursuant to Recommendation XIV-2 on environmental impact assessment, and increasing cooperation in scientific research and monitoring studies. The development of integrated, coordinated monitoring programs is important to be able to detect impacts of existing human activities in Antarctica. It is also important for collecting baseline data against which to measure changing local and global environments and in order to distinguish whether change is due to natural causes or human activities. Corollaries to establishment of such programs are the need to establish feedback loops to ensure that new information is taken account of in revising and supplementing applicable environmental protection measures, and provision for effective data management systems. USAP efforts to design, fund, and implement monitoring programs in Antarctica and related data management systems could become a driving force to

further such initiatives at ATCMs.

Comprehensive Environmental Protection Measures

In addition to these more specific agenda items, XV ATCM will also begin to consider comprehensive measures to further environmental protection in Antarctica. This discussion is to help identify the need to upgrade existing measures, gaps that should be addressed, the form in which such measures are adopted in order to ensure that they are legally enforceable, and other measures to enhance compliance with them.

Some of the gaps the ATCM mechanism could usefully consider addressing include measures governing storage and handling of hazardous wastes, in addition to their disposal; technology standards in addition to those on waste disposal, including such matters as energy conservation and alternative energy sources; and emission control standards. It might also be useful ultimately to look at contingency planning and emergency response procedures covering matters other than oilspills.

The discussion of the form taken by environmental measures governing Antarctic activities will be a delicate one, in light of proposals for a new convention on this subject. In my view it is critical to ensure that whatever the form, the measures adopted establish clear and enforceable obligations. It is also important to establish a practical and expeditious process by which these measures could be updated, in light of new stresses on the Antarctic environment, or new information on adverse

impacts or on technologies and procedures that may avoid or mitigate them.

There are also a variety of means that could help enhance compliance with applicable measures in Antarctica, including improved reporting requirements, increased public availability of information, and the establishment of procedures for additional fact-finding and collective review of potential instances of non-compliance. Agreement to establish an infrastructure under the Antarctic Treaty in the form of a secretariat would provide necessary support services for additional efforts to avoid and respond to environmental problems in Antarctica.

Finally, the discussion of comprehensive measures and how to advance them must not be allowed to impede immediate action on a number of the more specific items on the ATCM agenda.

I cannot predict the outcome of the XV ATCM in October, but it is clear that as a result of increasing public concern over environmental protection in Antarctica as well as worldwide concern about our changing global environment, this issue has gained renewed momentum. In my view the United States Government is contributing significantly to the further development of comprehensive measures for environmental protection in Antarctica. Oversight by this Committee contributes to the effectiveness of US contributions.

SENATOR HOLLINGS FOLLOW-UP QUESTIONS FOR MS. KIMBALL

1. Could you provide us with a summary of the results of the Paris meeting of the Antarctic Treaty nations?

See WRI report on XV ATCM attached.

2. In particular, how have the prospects for the Minerals Convention changed in light of the Paris meeting?

See in particular pages 13-16 of the WRI report on XV ATCM attached. IN SUMMARY,

As you know, the Minerals Convention was not an agenda item for discussion at XV ATCM. The context in which it arose was in consideration of agenda item 7 on 'comprehensive measures for the protection of the Antarctic environment and dependent and associated ecosystems'. During plenary discussions and informal negotiations on this agenda item, most countries supported parallel progress on (1) comprehensive measures, and (2) negotiation of the liability protocol required pursuant to article 8(7) of the minerals treaty, thereby supporting continued progress on the implementation of the minerals treaty. Fifteen of the 22 Antarctic Treaty Consultative Parties (ATCPs) that expressed themselves on this issue clearly took this view. Another 2 or so less clearly leaned in the direction of parallel progress.

This would lead me to believe that most countries wish to see the Minerals Convention enter into force. On the other hand, if Australia and/or France are not willing to ratify it (and neither one has taken that decision to date), it cannot enter into force. All of the other nations who must ratify it for it to enter into force have already signed the agreement. These are the five other claimant nations -- Argentina, Chile, New Zealand, Norway, United Kingdom -- and the US and USSR. It should be clear to Australia and France from the Paris ATCM that there is not much support either for putting aside the minerals treaty or for agreement to negotiate a comprehensive framework convention as an alternative (see below). This presumably means that over the next several months the ATCPs will seek to identify and resolve Australian objections to the minerals treaty.

The result of the Paris meeting on this topic was agreement to convene two meetings in 1990, one to consider all proposals relating to comprehensive measures, the other to consider all proposals relating to the minerals convention liability protocol.

3. What are the prospects for negotiation of comprehensive measures for the protection of the Antarctic environment?

There has never been any doubt about substantial support for comprehensive measures for the protection of the Antarctic environment, as witnessed by consensus agreement to place this question on the agenda of the ATCM when Chile proposed it in May. Specifically with respect to the Australian/French proposals, these contain two controversial aspects for which there is little support: the ban on minerals development, as noted above, and the proposal to agree ab initio to produce a new framework convention on this subject. Different points of view on the substance and form of comprehensive measures for the protection of the environment are considered below.

(1) substance -- Among the issues raised in the four detailed papers presented at XV ATCM on this agenda item (by Chile, France/Australia, New Zealand, United States), are (a) the development of a set of comprehensive principles on environmental protection in Antarctica, (b) gaps in existing conservation measures, and the need to strengthen and supplement these measures; (c) developing mechanisms to enhance compliance with Antarctic conservation measures; (d) integrating conservation measures and institutions within the Antarctic Treaty System (ATS) and with other international legal instruments and organizations beyond it; (e) providing for adequate directed scientific research and environmental monitoring to ensure that decision-makers have sufficient information to make informed management and regulatory decisions in Antarctica, as well as in relation to broader questions of changing global environments, and providing for related Antarctic data management systems; and (f) providing additional institutional support to ensure that Antarctic conservation measures are effectively implemented and enforced.

The most controversial issues here are the calls to strengthen the legally binding nature of measures and enforcement procedures, and the calls for further development of Antarctic institutions. Some claimant nations are anxious that these developments may infringe upon, or be interpreted from a legal point of view as infringing upon, their claims to national sovereignty in Antarctica. Nevertheless, strong support for further environmental protection and the evolving nature of international environmental law generally are likely to allow progress to be made on these issues.

The availability of financial means to carry out the necessary directed scientific research/environmental monitoring and to support additional institutional structures will also affect progress on these issues.

(2) form -- The issue here is whether comprehensive measures should take the form of a new framework convention, or

be cast as a protocol to the Antarctic Treaty, or as Agreed Measures adopted pursuant to the Antarctic Treaty, or even as Recommendation(s) adopted pursuant to the Antarctic Treaty. Australia and France have jointly proposed that the ATCPs agree to negotiate a new framework convention on comprehensive environmental protection. One or two countries in Paris among the ATCPs expressed some support for this idea. The others either expressed reservations about a convention per se, or took the logical view that, until the substance of comprehensive measures was defined, they did not wish to pre-judge the form. Nor was there support for the special meeting in 1990 becoming the first in a series to negotiate a new convention, as had been proposed by France/Australia. As noted above, the lack of agreement over form in no way undermines support for substantive development of comprehensive measures.

The prospects for progress on comprehensive environmental protection are not clear. On the one hand, many of the issues encompassed by the concept have normally been and will continue to be on the agendas of ATCMs. The Chilean proposal at the May preparatory meeting for XV ATCM to include this topic on the agenda, and the United Kingdom proposal in May for a special meeting in 1990 to concentrate on environmental issues, have added momentum to their consideration, enhanced to some extent by the Australian/French initiative. On the other hand, the linkage by Australia of comprehensive environmental protection with putting aside the minerals treaty and a ban on minerals development may lead some countries to stall on comprehensive measures until an acceptable solution has been worked out on the minerals treaty. At best, it will complicate significantly the broader comprehensive measures agenda. For those who had presumed that the minerals treaty successfully disposed of a potentially thorny issue that could undermine the stability of the Antarctic Treaty System -- most particularly in its accommodation of claimant/non-claimant views -- these questions have now all been re-opened.

In light of the disparity of views at XV ATCM, it was difficult to reach consensus on the two linked issues. This produced the agreement noted above that the 1990 meetings should remain open to all proposals on both comprehensive environmental protection and the minerals liability protocol, thereby allowing no definitive conclusions to be drawn about the substance or outcome of the two meetings.

4. Was progress made on the other environmental protection provisions on the agenda?

See WRI report on XV ATCM, attached, in particular pages 3-8.

It should be noted that "the other environmental protection provisions on the agenda" in fact constitute a substantial portion of those contemplated under the heading of

"comprehensive measures". Progress on these issues is integral to the further development of comprehensive environmental protection in Antarctica.

SENATOR GORE FOLLOW-UP QUESTIONS FOR MS. KIMBALL

1. How seriously are other nations taking the Australina proposal for a ban on mining in Antarctica?

See answer to question no. 2 above. The issue of a ban was not discussed at the ATCM in Paris, nor even proposed for discussion by either Australia or France. It came up indirectly in the context of progress on negotiation of the minerals treaty protocol on liability and the idea of a new framework convention.

2. Are other nations re-evaluating their positions? Which ones?

To my knowledge no Antarctic Treaty Consultative Party (ATCP) other than Australia and Belgium has supported the idea of a ban on minerals development. The French position is to support a framework convention on comprehensive environmental protection, but has not explicitly addressed the ban issue. Other countries like India to whom support for the Australian view has been attributed have also not supported a ban. At best they have expressed support for the idea of a comprehensive framework convention.

At the same time, one or two countries will probably defer decisions on the Minerals Convention until the outcome of the Australian position becomes clearer, since as noted below, non-ratification by Australia can block its entry into force.

3. In light of these developments, how likely to you think it is that the Convention will be approved?

Questions one and two address the likelihood of support for the Australian position on a ban (and presumably a comprehensive framework convention). It is clear that there is very little support for these ideas and certainly nothing like the ATCP consensus required. As noted in the response to Senator Holling's second question above, however, the Minerals Convention cannot enter into force unless both Australia and France ratify it. The real issue is therefore, whether acceptable compromises can be found that resolve Australia's difficulties with the Minerals Convention. (France to date has not expressly identified any difficulties with the Minerals Convention.) When one or two countries find themselves in an extreme position in relation to the preponderant majority, it is usually the minority that modifies its position. I think there is a relatively good chance that over the next several

months satisfactory compromises will be found.

4. The Bahia Paraiso oil spill has brought up some thorny foreign policy issues. What lessons do you think we should learn from the Bahia Paraiso spill?

That the ATS must develop additional measures to prevent and respond to oilspill emergencies in Antarctica, as agreed at XV ATCM. (See WRI XV ATCM report, pages 4-5 and 8).

That liability and compensation for oilspill damages in Antarctica must be extended to cover not just possible minerals development activities in Antarctica, but all other Antarctic activities, including supply of research operations in Antarctica and tourism, the two activities engaged in by the Bahia Paraiso; and in addition that, as provided for in the minerals agreement, the defense of sovereign immunity for such damages should not be permitted.

That in drafting the liability protocol to the Minerals Convention and implementing the Convention itself, the Bahia Paraiso incident has strengthened the possibility of agreement on more stringent requirements for vessel operation and safety in Antarctica than might otherwise have been possible, as well as on high standards for compensation and restoration for environmental damages. In particular, it should be possible to elaborate these to give effect to article IV(4)(a) of the Minerals Convention, which specifies that "No Antarctic mineral resource activity shall take place until it is judged that technology and procedures are available to provide for safe operations and compliance with paragraphs 2 and 3 above" (which specify the bases for assessments of possible impacts on the Antarctic environment and on dependent and associated ecosystems).

SENATOR KERRY FOLLOW-UP QUESTIONS FOR MS. KIMBALL

1. The Antarctic Treaty System includes the Convention on the Conservation of Antarctic Marine Living Resources, to protect fish, seals, whales, and marine organisms. It has been in effect for over six years now. The US research program for supporting CCAMLR is run by NOAA and has been severely underfunded. NOAA has less than \$2 million to monitor the entire Antarctic marine ecosystem. That's an embarrassingly small amount compared to the Soviets, the Japanese, and the Germans who are spending two to three times as much. Without investing in the research we can't assess the impact of fishing and other human activity in Antarctica. What key questions are being left unanswered? How much money would be needed to answer them?

I agree with the basic premise that the United States

should spend more money in assessing the impacts of human activities in Antarctica, including fishing. However, your question is better directed toward scientists and policymakers involved in studying the Southern Ocean marine ecosystem and the implementation of CCAMLR. I am neither.

2. The Australians and others have called for a comprehensive conservation convention to provide greater protection for the Antarctic environment. Discussion of such a convention will be on the agenda at the Paris meeting of the Antarctic Treaty nations next month.

In general, I would refer you to my answer to Senator Holling's third question, above.

a. What kind of Convention would you envision?

In the near term, as discussed in the answer to Senator Holling's third question, I would not see a convention per se as the immediate product of improving conservation in Antarctica. The first step will be to get agreement on what improvements are needed (e.g., on comprehensive environmental principles, institutions, additional conservation measures on such matters as tourism, handling and storage of fuel and other hazardous materials, contingency plans for response to spills, how to strengthen the binding nature of conservation measures, etc.) In my view most of the gaps and problems identified relate to activities governed by the Antarctic Treaty and would therefore be best served by a protocol to the Antarctic Treaty. At the same time that work progresses on such a protocol, the countries active in Antarctica should explore means to better integrate decisions and institutions taken pursuant to each of the now four Antarctic agreements to enhance protection of the Antarctic environment. Whether at the end of the day it becomes possible to actually integrate the different legal instruments and different decision-making procedures and institutions under a single umbrella convention remains to be seen. In any case, form follows substance.

b. Is it possible to adopt the Minerals Convention and then later adopt a more extensive, stricter Conservation Convention?

It is certainly possible and in my view desirable to adopt the Minerals Convention and at the same time pursue improvements in Antarctic conservation under the other Antarctic agreements, particularly with respect to a protocol under the 1959 Antarctic Treaty as noted immediately above. At that point, consideration of a more extensive convention might be possible. It should be noted that there is absolutely no basis for assuming that negotiation of a comprehensive convention will somehow produce stricter conservation requirements than could otherwise be negotiated under each existing convention. There is good reason, in fact, to assume

the opposite. To date the ATCPs have only been willing to agree on stricter, more binding measures in the context of the minerals convention, in light of the order of magnitude differences posed by minerals activities and the other activities currently carried out in Antarctica.

As discussed in the answer to Senator Holling's third question, there is some reason for concern that unless the minerals convention issue is resolved to the satisfaction of most nations (i.e., entry into force), progress on the broader conservation agenda may atrophy.

c. How long would it take to negotiate a Conservation Convention?

This probably depends on when one seeks to negotiate it. If starting tomorrow (for which, as noted in the answer to Senator Holling's third question, there is virtually no support), it might take many years. The re-opening of the issues presumed settled in the Minerals Convention, if combined with negotiation of a comprehensive convention, might overload the system. Some countries might hold progress on the conservation convention hostage to satisfactory resolution of the minerals issue. If the question of minerals development was not addressed in the comprehensive convention, its negotiation would likely take place with an eye over one shoulder to evaluate how agreements reached might affect negotiation in the future of a solution to the minerals issue.

If, however, the substance of what was required to improve conservation in Antarctica were first agreed, and the minerals question satisfactorily resolved, it is possible that a comprehensive convention might fall into place relatively quickly. The most difficult issue will remain the relationships among the different decision-making institutions and procedures that presently exist under the Antarctic Treaty, CCAS, CCAMLR and CRAMRA.

Senator GORE. Very good. Thank you very much.

Our final witness is Jim Barnes, Executive Director of the Antarctica Project of the Antarctic and Southern Ocean Coalition, an international coalition of more than 100 environmental organizations concerned about Antarctica.

Welcome, Mr. Barnes; please proceed.

STATEMENT OF JAMES N. BARNES, EXECUTIVE DIRECTOR, ANTARCTICA PROJECT, ANTARCTICA AND SOUTHERN OCEAN COALITION

Mr. BARNES. Thank you, Senator Gore.

First, I would like to say a brief word about this coalition, the Antarctic and Southern Ocean Coalition. It has been in existence now for more than 10 years and what we have attempted to do, Mr. Chairman, is to monitor what the governments are doing in the Antarctic Treaty context. That has been somewhat difficult because, for the most part, non-governmental groups have not been permitted to participate as observers in the system.

So, for the most part, we have hung out with the governments wherever they go around the world as they negotiate minerals conventions, for example, and try to provide our views in various informal ways. And we publish a number of documents, which we have made available to your staff in the past about these negotiations.

At the outset, I would like to say that all members, and there are actually more than 200 of these conservation organizations that are members, are opposed to oil or minerals development in the Antarctic. They all favor a future for the region that is based on cooperative scientific research and protection of wildlife and wilderness values.

And I will come back to that a little bit later in discussing the minerals convention.

Senator GORE. They are unanimous in their view on the Convention?

Mr. BARNES. They are not totally unanimous at the present moment on the Convention itself. No organization that is part of the coalition wants to see minerals development in the Antarctic, and I can provide some more details.

Senator GORE. It is a pretty even split on whether the Convention ought to be ratified or not?

Mr. BARNES. At the present moment, Senator, I am unaware of a single member who actually favors the ratification of the instrument, but many have not taken a formal position. And I think you will see a lot of groups taking formal positions over the next several months if the Convention is submitted to the Senate for ratification.

Senator GORE. How many have taken the position actively opposing its ratification?

Mr. BARNES. On an international basis, I think it is probably close to half. But it depends on how one exactly counts, but it is a large number.

Senator GORE. What about in the U.S.?

Mr. BARNES. In the U.S., the organizations that I am aware have taken a formal position are Greenpeace and the Humane Society of the United States, and the other groups are carefully studying this question and I think will have public statements in the near future on this question.

Senator GORE. So Greenpeace and the Humane Society are the only two that have actively opposed ratification?

Mr. BARNES. In the United States. As I said, this question has not been presented yet to the Senate for ratification.

Senator GORE. I thought that there were some environmental organizations who actively supported its ratification?

Ms. Kimball, is that correct?

Mr. BARNES. Well, the World Resources Institute, obviously, supports it.

Ms. KIMBALL. The World Resources Institute is a policy research institution and does not have members. My advice is that the minerals treaty should be ratified. As Jim says, everybody opposes minerals development in Antarctica; that is not the question. The question is what is the best way to ensure against it.

Senator GORE. Right. But when you said no organization actively favored it, you were just talking about the 200 within your coalition?

Mr. BARNES. That is right.

Senator GORE. WRI is not part of that coalition?

Ms. KIMBALL. That is right.

Senator GORE. Are there others besides WRI, who are not in Mr. Barnes' coalition, who actively support its ratification?

Ms. KIMBALL. Nobody has yet taken that view either. They have not had to face the question.

Senator GORE. Well, WRI has, right?

Ms. KIMBALL. WRI has.

Senator GORE. Is WRI the only one?

Ms. KIMBALL. As far as I know, WRI is the only organization that is clear, supporting it at this time.

Senator GORE. All right. We will come back to this, but I wanted to interject that exchange.

Go ahead.

Mr. BARNES. Thank you, Senator.

In my testimony I have tried to address quite a range of the current environmental problems in the Antarctic, but not the minerals question. I understood this hearing was, in general, not going to focus on minerals. So we have left that for another day.

We have provided a lot of information for the committee about the wilderness values in the Antarctic, which we think are extremely high and valuable and ought to get a great deal of attention in the future by governments.

In that connection, we are very pleased by the Australian initiative, which you referred to in your opening statement, Mr. Chairman, which addresses the need for what they call a comprehensive environmental protection convention.

It is my current understanding that virtually all environmental groups in the world, that I am aware of, do support the Australian initiative, and increasingly, governments are supporting this initiative. And I just wanted to take a couple of minutes to read a te-

ments that I have recently received from some governments, indicating what they are saying.

On 18 August 1989, Prime Ministers Hawke of Australia and Rocard of France released a statement and they said: "In the light of their shared concerns about the Antarctic Minerals Convention and other factors affecting the environment in the Antarctic, the Prime Ministers have today agreed on a joint initiative to promote the protection of the environment in the Antarctic. Both Prime Ministers indicated that mining in Antarctica is not compatible with protection of the fragile Antarctic environment."

And they go on to talk about how they are pursuing this initiative.

On June 30, 1989, in Belgium, there was a statement by the Foreign Minister of Belgium about a law that had just been passed in Belgium, basically, prohibiting any Belgian nationals from ever carrying out minerals activities in the Antarctic.

And the Foreign Minister says, "The Convention of Wellington is dangerous and it is not advisable to ratify this treaty. The best solution is to turn the Antarctic into a worldwide nature reserve, as far as this would be legally and politically possible."

On 9 June, New Delhi issued a statement jointly with the Australian Environment Minister, who was in India at the time, saying, "India agrees with Australia on the need to protect the Antarctic environment. India is prepared to join in any effort to achieve an environmental convention or agreement on Antarctica whose primary aim is to preserve and protect the environment and its associated independent ecosystems." And so forth.

And I think what we are seeing, Mr. Chairman, is that, as a result, in part, of much improved understanding of what we are doing to this planet over the last eight years, since the Minerals Convention negotiation began in 1982, we are seeing governments taking a second look. And they are not getting involved in detailed discussions of whether the Minerals Convention is the best environmental convention ever to be negotiated, et cetera, which is a point sometimes made by proponents of the Convention, but rather, is this the right approach for the Antarctic? Does this take us on a path that we want to go down, in view of what we have learned about what is happening to this planet and about the particular role of the Antarctic in scientific affairs and global climate and weather, as a sanctuary for wildlife and so forth?

I think it is very significant to see this momentum coming from countries like Australia and France; these are claimant countries in the Antarctic. Either one of them, if they adhere to this position, can make certain that the Minerals Convention never will come into force.

But there is another aspect to the calculation as well. Sixteen out of the 22 full members have to ratify this convention for it to come into effect. If any one of the claimant countries or the U.S. or the USSR were to not participate, then it would not go forward. But there has to be 16 countries total that participate.

And there are developments in a number of other countries that I have not mentioned, including Italy, for example, and Sweden, which would suggest that we are close already to having less than

16 countries willing to participate in ratifying that minerals convention.

At any rate, what I would like to stress today is the need for the United States to support the Australian initiative, to look at the comprehensive environmental protection needs of this region, which, as you stated and pointed out, is more than 10 percent of the Earth's surface, counting the land and the water.

This is a region which does not, at the present time, have a regulatory framework for actually regulating human activities. And all the wonderful words in the world that we have written down, and we are all very pleased with a lot of these words in the environmental community, but they are words, unless they are connected to enforcement mechanisms, compliance mechanisms, and so forth.

And there are some fundamental difficulties with the treaty system, which have been alluded to in all the other statements here today. We believe the Australian initiative provides a vehicle, as we move into the 1990s, to seriously address the regulatory needs of the Antarctic region. And we urge the United States to give it full support.

At the present time, I do not think the United States appears to be giving it full support.

I would be happy to answer any specific questions about the many points in our testimony. We have dealt with the *Bahia Paraiso*, for example, where we encourage the United States to quickly put together a bill, so to speak, and present it to the Argentine government in the appropriate ways.

There are a number of such ways that bills for damage could be presented to the government. Also as I know we are beginning to do, we can use this as a vehicle to present to the treaty parties the need right now to move forward with the comprehensive liability framework for the Antarctic.

We have noted a couple of things that seem rather minor, this accident happened in large part because of two things. First, the charts showing the dangerous shoals and rocks in the region are not agreed charts. There is not one set of Antarctic charts in this marvelously cooperative system down there.

Secondly, even when the captain of the boat was warned by base personnel at our base that this was a dangerous approach, a dangerous passage, it was just ignored.

I am just using that as an example of some of the rather modest things that could be done in the near term to improve the safety of operations in the Antarctic.

Finally, we would like to commend you for your proposal a few months back to set up the equivalent of regional response facilities, teams and things of that sort which are said to be standard practice in our country. We know from the *Valdez* incident they were not good enough, but there is nothing in the Antarctic. We hope that your proposals can be taken forward by the United States and internationally.

Thank you, sir.

[The statement and questions and answers follow:]

STATEMENT OF JAMES N. BARNES, EXECUTIVE DIRECTOR, THE ANTARCTICA PROJECT

I. Introduction

I am James N. Barnes, Senior Attorney with the Environmental Policy Institute, Friends of the Earth and the Oceanic Society. Earlier this year these three organizations merged to form a new global advocacy organization, which has 33 international affiliates. I also serve as general counsel to the Antarctic and Southern Ocean Coalition (ASOC), which comprises more than 200 conservation and environmental organizations in 35 nations.

This statement is presented on behalf of The Antarctica Project, Environmental Policy Institute, Friends of the Earth, Greenpeace-U.S.A, National Audubon Society, National Wildlife Federation, Natural Resources Defense Council, Oceanic Society, Sierra Club, The Humane Society of the U.S., Wilderness Society and World Wildlife Fund.

We are pleased for the opportunity to present this testimony and wish to commend the Subcommittee for its initiative in addressing some urgent environmental problems in a part of the world often ignored in the U.S.

II. Summary

Antarctica has been in the news lately primarily because of three things: the research that has been done on the phenomenon of ozone depletion, in particular concerning the large hole that opens annually over Antarctica; the oil spill caused by an Argentine vessel running aground off the Antarctic Peninsula, which has jeopardized more than twenty years of important scientific research and wildlife living in an almost pristine environment; and the recent completion of a Minerals Convention which will, if ratified and brought into force, open up the question of minerals development in the region.

In general, it is our view that Congress should be playing a larger oversight role concerning U.S. activities and policies in the Antarctic. Human activities are increasing rapidly there, and adverse impacts of those activities are mounting. Congress has significant responsibilities regarding the formulation and implementation of U.S. policy in the area. It can also, through the appropriations process, provide the necessary resources for a balanced program that ensures U.S. leadership for the region and full compliance with our responsibilities as trustees for this area.

In this connection, we strongly support the Administration's request for a special series of appropriations to clean up U.S. bases in the Antarctic. This is part of multi-year initiative on Safety, Environment and Health issues, which is projected to require at least \$30 million during the fiscal years 1990-93. We urge that Congress appropriate the \$10 million requested by NSF for FY90, and also recommend that it continue funding this special program as long as is necessary.

We do believe, however, that there is much more to be done, both in terms of how national programs are carried out and how the Antarctic Treaty System (ATS) is structured and functions.

At the outset, we wish to commend to the Subcommittee's attention a recent Report to Congress by the Congressional Research Service, entitled "Antarctica: Environmental Protection Issues", April 10, 1989. It contains a useful discussion of many current environmental issues in the region. Several other reports prepared by NGOs provide details of how the National Science Foundation and other U.S. agencies have failed to comply with many of their responsibilities. Those reports include (1) "On Thin Ice, The Failure of the National Science Foundation to Protect Antarctica" (B. Manhiem, Jr., August 1988), (2) "Waste Management in Antarctica" (J. Barnes and P. Lipperman, September 1987), and (3) "Expedition Report: 1987-88 Greenpeace Antarctic Expedition". "On Thin Ice" contains 12 recommendations, which we endorse. "Waste Management in Antarctica" contains a number of recommendations that could form the basis of a model program. The Greenpeace Expedition Report provides details of non-compliance with the Code of Conduct on Waste Disposal, based on their private inspections of many Antarctic bases.

In the Antarctic, which comprises about 10% of both the earth's land and water areas, there is no Environmental Protection Agency, nor is there an Infractions Committee to objectively ascertain violations of the rules and report on actions necessary to enforce those rules. Participation in Treaty meetings and other affairs is, for the most part, not open to non-governmental and inter-governmental organizations. Public accountability is lacking. The Antarctic Treaty System does not have many of the elements of a normal regulatory system.

We submit that the member governments must be willing to create the regulatory machinery required to actually control human activities. One of the main difficulties is that the ATS has no mechanism to enforce its own rules and regulations. Further, the obligation to carry out ongoing scientific research that is required for achieving decision-making status under the Antarctic Treaty discriminates against nations which choose not to build a permanent station. Most candid observers believe this has led to a concentration of bases and duplication of research efforts in geographically more accessible areas, with resultant serious environmental impacts in many of these areas.

The present system relies too much on good will among the members. Governments point to the fine words in various documents, rather than dealing with absence of any system to enact proper codes and rules and ensure that those are enforced as to all activities. The recent NSF report on application of U.S. laws in the Antarctic is illustrative of the approach of most governments, which want to protect their freedom of action in the Antarctic and have been unwilling to provide the regulatory infrastructure that is deemed essential in most countries.

A current proposal by Australia addresses the need for proper management of the Antarctic. Its proposal for the "urgent negotiation" of "a comprehensive environmental protection convention" is on the table, awaiting response from other member governments. This approach could lead to the establishment of an Antarctic Environmental Protection Agency, set needed controls on tourism, provide for imposition of liability covering all activities, and require comprehensive monitoring programs.

We urge the U.S. to respond positively to the new Australian initiative to negotiate a Comprehensive Environmental Protection Convention. This initiative will be debated at the forthcoming Antarctic Treaty Consultative Meeting in Paris from October 9-20. This initiative has been endorsed by France, and has been commented on favorably by a number of other member nations since it was proposed in May. Attached to this statement as Appendix 1 is an Information Paper published by ASOC that describes how such a convention could be structured and how it would work.

Another pressing need is for the scientific potential of the region to be re-evaluated, in a process designed to weed out duplicative or relatively useless research and to foster the most important research on an even more cooperative international basis than now is the case.

The proposed revision of the Code of Conduct for Waste Disposal contains many good provisions, but there have been serious problems of compliance with the existing Code and further improvements would be prudent.

The ATS needs to be opened fully to the participation of interested UN agencies (including the United Nations Environment Program), international organizations, and non-governmental organizations. This is a vital aspect of making the ATS more accountable.

Finally, we are proposing that the U.S. take the lead in having the austral year 1990-91 declared the Year of the Antarctic Environment, to help raise the visibility of the region and engender a debate about its future.

The Subcommittee has asked witnesses to address the most pressing environmental problems in the region, other than the question of minerals, which is to be considered in later hearings. The remainder of this statement will discuss why Antarctica is so unique and fragile, what can be done to clean up environmental damage from past activities, and how on-going and future activities can be better planned and regulated so as to minimize environmental harm.

III. Antarctica's Unique Characteristics

Antarctica is a significant regulator of the earth's weather systems, a phenomenon of limited scientific understanding. Any major change in the Antarctic environment could have unpredictable impacts on the climates and environments of other parts of the earth.

Its land mass of approximately 13.5 million square miles is mostly covered by ice. The less than 2% that is exposed often provides critical habitat for birds and marine mammals.

The surrounding ocean is rich in planktonic species, which provide a foundation for the marine ecosystem. It also is the site of the Antarctic Convergence Zone, where colder waters of the Antarctic sink below the warmer waters of the Pacific and Atlantic Oceans, providing the environment for explosions of life, and nutrients that are carried thousands of miles to other parts of the earth.

The region holds many secrets of the earth's past. It may also be the best monitoring zone for global pollution, vantage point from which to observe the degradation of the earth's natural systems.

The state of knowledge about Antarctic ecosystems is

limited. Thus, our ability to predict accurately the possible impacts of various human activities is commensurately limited. A central theme of all efforts for protection and conservation in the region is the need for greatly increased research on all aspects of Antarctica's ecological structure. This research is an essential precondition for sound management policy.

A. Wilderness and Wildlife

The U.S. Wilderness Act of 1964 defines a wilderness as "an area where the earth and its communities of life are untrammelled by man...where man himself is a visitor who does not remain...and which generally appears to have been affected primarily by the forces of nature with the imprint of man's work substantially unnoticeable....."

One aspect of "wilderness" in the Antarctic is the status of animal populations. Antarctica has the largest populations of wildlife left in the world, tens of millions of marine mammals and birds that are free to migrate, feed and breed as they have for countless numbers of years in their natural state. If the whale moratorium continues in effect, Antarctica can be seen as the last great wildlife sanctuary in the world.

As Geoff Mosely, formerly the Director of the Australian Conservation Foundation, has noted, "Antarctica presents an opportunity for wilderness conservation on a hitherto unequalled scale. The continent has an area of 13.2 million square kilometers. By comparison the world's largest terrestrial national park in Greenland covers only 0.7 million square kilometers, and the Great Barrier Reef Marine Park - the world's largest marine park - covers a mere 0.3 million square kilometers....[T]he sheer size of the Antarctic, its remoteness, the lack of a clear cut national jurisdiction and the nature of the benefit which could be promoted would place the wilderness reservation of this region in a class of its own."

The ATCPs have had great difficulty in formally recognizing the principle of protecting wilderness values in the Antarctic. None of the conservation measures developed so far have been directed toward that end. But independent groups such as the International Union for Conservation of Nature (IUCN) have passed resolutions on this subject. For example, the 1981 Resolution on Antarctica of IUCN's General Assembly, at which many Antarctic Treaty members were represented, recognizes "the importance of Antarctica and its Continental shelf and the Southern Ocean for the world as a whole, particularly in maintaining the stability of the global marine environment and atmosphere, and the paramount importance to mankind of its great wilderness qualities for science, education and inspiration."

The present system of environmental controls over scientific, logistic and other Antarctic activities does not work to prohibit a particular base or airstrip that will adversely

affect wilderness or habitat values. Even the newly adopted environmental assessment procedure is not binding on the parties in any meaningful sense, and it, of course, imposes only a procedural requirement.

Today, more than 60 bases have been established on the continent by member governments. Other nations which seek full membership in the ATS have announced plans for building new bases. Numerous proposals for new or enlarged air fields are pending. One major airstrip--at Terre Adelie, continues to be constructed by the French in a unique wildlife habitat, in spite of the opposition of most scientists and environmental organizations.

It should be noted that the ATCPs have established mechanisms for Specially Protected Areas (SPAs) and Sites of Special Scientific Interest (SSSIs), and now have under consideration a new category of protected area, which would allow for multiple use management. If approved at the forthcoming Consultative Meeting, it will be called an Antarctic Protected Area (APA). Very few sites have been formally demarcated, however, and given protected status. Since 1966, only two SPAs have been designated.

Antarctica is the home for hundreds of millions of seals, whales, penguins and seabirds, an unparalleled sanctuary for wildlife. We note that research is being done on Antarctic wildlife. There also are many reported incidents of base personnel harrasing wildlife and disrupting their habitat or feeding activities. Our members are concerned that all Antarctic living organisms are treated humanely, in all their interactions with humans.

B. Scientific Potential

At present, Antarctica is a global scientific laboratory of immense value. The near pristine nature of the region provides a baseline against which we can measure pollution in more populated regions. The secrets locked in its near-pristine ice cap are permitting the exploration of some of the evolutionary mysteries of the planet. Many simple terrestrial and aquatic ecosystems found in Antarctica are available as models which can be used to follow critical biological processes both at the population and community levels.

Antarctica is of critical importance to research on ozone depletion and the greenhouse effect. The International Geosphere-Biosphere Programme (IGBP) has been established under the auspices of the International Council of Scientific Unions (ICSU). IGBP describes the importance of polar regions in this way:

The polar regions are very sensitive to changes in the global environment and may act as "warning signals" to

changes in the total energy flux into our Earth and to changes in the atmosphere. The polar regions also act as global historians, maintaining records of past global environmental conditions within their permanent ice fields.

IGBP is co-ordinating international research efforts in polar regions, focusing on prime indicators of global change: ozone concentrations, ice cores, polar ice levels, and polar temperatures. It is important that such phenomena be studied without interference from local sources of pollution.

Due to increasing human activity in the Antarctic, it would be useful to evaluate the significance and impacts of research activities, in order to ensure that only the most useful science is carried out and that impacts are minimised. It is clear that some of the science currently being carried out is, either directly or indirectly, adversely affecting the environment. There are too many bases already, yet the trend is to build more and more, often concentrated in particular areas that afford easier access.

In our view, scientific research should be:

- o internationally coordinated to avoid duplicated efforts,
- o environmentally benign,
- o of global significance and/or unique to the Antarctic, and
- o fully available to the public.

This type of scientific research should be the activity given first priority in Antarctica. We submit that a long-term scientific program for the region should be developed, which focuses on use of the region's unique attributes for the benefit of the entire global community.

It is our view that the Antarctic potential as a platform for extremely important research on global problems is not being fully utilized. Our ability to manage and control increasingly varied and intense human activities and their impacts on natural systems is dependent on a much better understanding of the interactions of fundamental components of the global ecosystem. Depletion of the ozone layer, global marine pollution, long-range transfer of pollutants, and climate change phenomena require coordinated studies on a global, interdisciplinary, multi-institutional basis.

These programs require increasingly sophisticated field instruments, research techniques, computers and satellite capabilities, which are beyond the resources of most nations and any individual research institution.

In order to fully realize the benefits of increased understanding of the earth and its systems now open to us,

careful long-term planning and allocation of financial and intellectual resources is required, as well as continuity of support for these large global research and monitoring programs.

As outlined in Project Blueprint, which was submitted to the Administration and Congress late last year, the following actions by the U.S. would be appropriate:

1. The NSF and other agencies, such as the Environmental Protection Agency and National Oceanic and Atmospheric Administration, should play a more active role in directing research efforts toward priorities rather than merely responding to individual research proposals received on an annual basis. This requires a continuing effort to identify priority research and monitoring programs and critical information gaps, and then to coordinate cooperative programs. Collection of time-series monitoring data focused on particular questions is fundamental to our ability to detect (and ultimately predict) environmental changes, and to distinguish their causes. It is also critical to decision makers' ability to make judgments about the potential impacts of proposed human activities, and thus to manage them effectively.
2. The Congress should ensure that the Assistant Director for Geosciences at NSF, working with the Administrators of EPA, NOAA and NASA and other appropriate agencies, steadily expand basic research on oceanic, atmospheric, terrestrial and polar issues, their interactions, and their roles in global change and support for living species.
3. The Assistant Director of NSF should ensure the full implementation of the recommendations contained in the 1987 Report to the National Science Board entitled "The Role of the National Science Foundation in Polar Regions".
4. The NSF should improve coordination at the operational level among the divisions within the Geosciences Directorate and with other agencies, as well as internationally, and should ensure that new incentives are made available for the scientific community to design and carry out interdisciplinary research and monitoring efforts that integrate individual proposals from different institutions into logical, coherent programs.
5. The achievement of professional awards and standing in the scientific community is based on specialization. There are insufficient rewards for individuals to pursue careers in interdisciplinary study, yet today's major unanswered questions about earth systems must be studied on that basis. Congress should pass legislation to address this problem.
6. Congress should require (1) that there be a regular process for both intra-divisional and interagency consultations on these research needs and program, (2) that programs are developed for the solicitation by NSF of multi-year proposals for monitoring and directed research, focused on priorities

identified by relevant advisory boards, and (3) that substantial increased appropriations are made for these long-term research and monitoring programs. It is recommended that the real budget for these programs increase by at least 15% per year for the next five years.

We note that a comprehensive environmental protection convention would promote greater coordination of scientific programs than exists at present. This would include shared logistic support facilities. Countries wishing to initiate Antarctic programs for the first time would be encouraged to share the facilities of existing bases; participation in the management of Antarctica would not require the establishment of a base as a necessary precondition. Such cooperation would constitute a positive effort to create multifaceted international understanding, while reducing the impact of the ever-growing number of scientific stations and other facilities on the continent.

IV. A Comprehensive Environmental Protection Convention

The Australian proposal for a comprehensive environmental protection convention would lay a foundation for regulating such activities in light of the large values to the world community of keeping Antarctica as pristine as possible. ASOC supports achieving the permanent protection of the region through the negotiation of a conservation convention. Its purpose would be to ensure the conservation of the Antarctic environment and the maintenance of integral ecosystems. It would provide principles, policies, procedures and mechanisms to coordinate, manage and limit human activities in the Antarctic region.

Such a convention would acknowledge the important role of the Antarctic region in global pollution monitoring, the use of the Antarctic exclusively for peaceful purposes, the unique aesthetic and wilderness values of the region as a part of the earth relatively undisturbed by humanity, and its potentially substantial contribution to scientific knowledge.

A. Principles and Obligations

An environmental protection convention would include obligations to adhere to a set of principles against which all activity in the Antarctic would be judged. We suggest that those principles include the following:

1. The Antarctic should be an area where wilderness values are paramount;
2. The Antarctic should be an area where there is comprehensive conservation of flora and fauna (terrestrial and marine) and the environment (including atmosphere);

3. The Antarctic should be an area of limited scientific research which encourages cooperation between scientists of all nations;
4. The Antarctic should be an area of peace, free of nuclear and other weapons and all military activities.

There would be obligations on every member state to protect the Antarctic environment and dependent and associated ecosystems; respect Antarctica's significance for, and influence on, the global environment; respect all legitimate uses of Antarctica; respect Antarctica's scientific value and aesthetic and wilderness qualities; ensure the safety of operations in Antarctica; take into account the interests of the international community as a whole.

The proposed convention would require that no activity be allowed to take place unless it is judged that the available information is sufficient to conclude that the activity in question, by itself or in combination with other activities, will not directly or indirectly:

1. Cause or contribute to changes in the Antarctic atmospheric, terrestrial, fresh water or marine environments and their associated ecosystems from which effective recovery is not probable within the short-term,
2. Affect local, regional or global climate or weather patterns,
3. Disturb atmospheric, terrestrial, fresh water or marine environments and their dependent or associated ecosystems,
4. Endanger or further jeopardise the existence of any species or population,
5. Adversely affect unique biological communities or areas of special biological, scientific, historic or aesthetic importance, including the breeding and feeding habitats of any species,
6. Be incompatible with or prejudice the implementation of Article II of the CCAMLR.

B. Procedures

The judgments described above would need to be based on environmental assessment procedures carried out on an international basis, with participation of all member states and observers. Those environmental assessments should be based on information allowing the prediction, within a reasonable margin of error, of the normal operational impact of the activities in

question, the identification of the nature and likelihood of possible accidents of environmental significance, an evaluation of the impacts of such accidents should they occur, the cumulative impacts of otherwise acceptable activities, and a thorough evaluation of alternatives, including the alternative of no action.

A periodic review process, effective inspection system and appropriate enforcement procedures would be required to ensure the integrity of such judgments.

V. Recent Accidents

One reason that Antarctica has been a focus of concern for environmentalists worldwide is because of four accidents in the last year:

- o In September 1988, a fuel bladder leaked at McMurdo resulting in the release of more than 13,000 gallons of fuel near Williams Field;
- o the Argentine vessel Bahia Paraíso sank on January 28, 1989 near Palmer station;
- o the Peruvian BIC Humboldt, was punctured on February 28, 1989 in Filges Bay; and
- o the British resupply ship HMS Endurance hit an iceberg near Deception Island in February, 1989.

A. Bahia Paraíso

The area where the Bahia Paraíso ran aground was well mapped, and the ship was built in 1980 especially for Antarctic resupply purposes. She hit submerged rocks, causing the vessel to capsize and necessitating the emergency evacuation of crew and tourists. Soon after, a spill of diesel fuel oil was registered as a consequence of damage to the ship's tanks.

Senior NSF officials have corroborated that the captain of the Bahia Paraíso was warned by U.S. base personnel not to come through the passage used, because it is marked as highly dangerous - pinnacle rocks on the charts. The warnings were ignored.

The Argentine Navy was officially nominated to release information to the public. However, the Naval Public Information Department's press releases were oriented more towards logistical aspects than the environmental impact of the accident. Conflicting information regarding the amount of oil spilled and resultant damage was reported by different ships in the area.

Argentina contracted the Dutch salvage company Wijsmuller to

advise on the recovery of the ship, a fact that was not made public in Argentina and denied by the Navy's spokesperson when consulted. However, when Wijsmuller experts arrived in the area in late February, there was insufficient time to recover the ship.

The Argentine Navy announced the end of operations on March 21. It summarized the logistic and scientific works carried out, stating that no visible impact on the local ecosystem had been noted. A more detailed report was presented by Argentina at the Treaty meeting held in Paris in May, but it consistently plays down the harm to the U.S. research program and to the environment. It is fair to say that the U.S. government does not agree with that assessment, although the one page "supplement" to the Argentine report that was issued by the U.S. on May 12 is restrained in reciting the damage caused by the spill.

The Polar Duke arrived at Palmer on the morning of February 7 carrying NOAA, U.S. NAVY, U.S. Coast Guard personnel, plus specialists from private industry. Cleanup equipment included 2600 feet of inflatable booms, a 36ft. skimmer boat, and two 24ft. work boats. Cleanup began immediately, w/900 gallons of a water/fuel mixture soaked up on the first morning.

There were two materials fouling the environment: diesel fuel and lubricating oil. The diesel stays on the surface for the most part. The lube oil almost immediately emulsified into a yellow, stringy scum. Both substances collected in coves, inlets and tidal pools.

Regarding impacts on wildlife, we commend the U.S. government for taking quick response actions. Personnel at Palmer from the beginning of the incident were busy observing, documenting and tracking the local wildlife. An effort to band penguin chicks was started.

The intertidal zone appears to have been the most affected. There was high mortality among limpids, kelp and sponges. The benthos is not expected to be as impacted. In order for diesel to reach the bottom, it needs particulate matter to carry it there. It was stated that the water is too clean and free of the particulate matter needed to carry the diesel.

The birds, particularly the skuas, were the hardest hit. The breeding success of the skuas around Palmer is expected to be very low. Of the 53 nests that have been studied for 20 years, only 6 chicks were alive shortly after the accident. (There are normally two chicks per nest, and usually only one survives.) Scientists also found many dead cormorant chicks, and some dead penguins. The diesel destroys the natural oils on the penguins' feathers, and thus allows cold water to penetrate to the down and the skin. The animals' insulation is destroyed. Several seals were sighted with oil sheens on their coats.

In general, it's too early to determine the effect on the

local ecosystem. Research at Palmer will continue. For 20 years the biologists have studied the natural variability of the wildlife in the area and now they will study the effects of a non-natural occurrence. We await with interest the results of the joint U.S.-Argentine research effort, but we urge that an independent study be carried out for a sufficient number of years to learn the true impacts of the accident. In this respect, perhaps the long-term research program carried out in France at the site of the Amoco Cadiz spill in 1978 would be a good model.

B. Humboldt

On February 28, the Peruvian ship BIC Humboldt ran aground in Fildes Bay, King George Island/Is. 25 de Mayo. The Humboldt was on the last leg of its summer expedition, after opening the first Peruvian research station, Macchu Picchu. Again, there were conflicting reports about whether a spill had occurred and the risks of pollution. An official press release from Peru stated that the situation was under control and that there were no risks. At the same time, the media reported that the Humboldt's lack of an ice-strengthened hull made it doubtful the ship could withstand the strong winds and large swells common in the Antarctic, suggesting that a spill was imminent. A few days later, an official press release from the Peruvian Government announced the ship was sailing back to Punta Arenas, Chile. No follow-up on environmental impact was made available, and to our knowledge, none was done.

C. Endurance

On February 7, the British resupply vessel HMS Endurance hit an iceberg 4 feet below the waterline, near Deception Island. The Endurance moved to Esperanza Bay, where it stayed from February 11 to 17. Photographic evidence obtained by Argentine scientists during the ship's presence there demonstrated the fact that a spill occurred, although this was denied by the British Antarctic Survey when questioned.

D. Implications

Although the three marine accidents occurred in ships belonging to three different Antarctic Treaty countries in three different places, they share similarities worth noting.

- o There was no way in which any of the accidents could have been foreseen, because of the element of human error.
- o All three ships were resupply vessels for Antarctic stations, which would suggest that all were deemed suited to sail in Antarctic waters.
- o The accidents all occurred during the summer, the most

benign season in the Antarctic. At the time of each accident weather conditions were favorable.

- o Information provided by the governments of Argentina, Peru and United Kingdom on the accidents was inadequate or unavailable, and none provided enough information on possible environmental effects.
- o It took a long time before clean-up and rescue equipment arrived.

This series of accidents, particularly in light of the Exxon Valdez spill in the Arctic, raises some serious issues for the Antarctic Treaty System. ASOC has asked that information on the following be provided prior to the October ATCM:

- o Full disclosure on the causes and consequences of the accidents should be provided by the governments involved;
- o Mechanisms to assess liability and compensate for damages arising out of accidents in the Antarctic should be developed;
- o Scientific monitoring programs to measure any impacts should be undertaken;
- o A plan of action should be developed to remove the BAHIA PARAISO in the spring, to prevent further damage to the environment;
- o Measures should be developed to ensure that future accidents of this nature will be remedied more quickly and effectively than occurred last season.

ASOC has noted that there are not even cooperatively produced charts available for all vessels navigating in the Antarctic, that there are no depots of clean-up equipment located anywhere in the region, and that no emergency response teams have been trained.

As for the costs of the Bahia Paraíso accident, we submit that the U.S. government should prepare a comprehensive claim for the costs of cleanup, damage to our research effort, and damage to the environment, and should formally submit it to Argentina. This matter should be handled both as a bilateral problem between two countries, and as a matter for the Antarctic Treaty System. It may be necessary to explore legal action in Argentine courts, although the question of sovereign immunity may arise since a government vessel was involved. Further actions also are required to deal with the wreck, which maintains the potential to cause further environmental damage.

We note that the Australian proposal for a comprehensive environmental protection convention would address the general question of liability in the Antarctic, which should be a high

priority of the member governments.

VI. Waste Disposal

Thirty years of increasing human activity in the Antarctic have exerted cumulative pressures on local ecosystems, particularly around major bases and facilities, with waste disposal being the major problem. These pressures are likely to increase, given the recent expansion in the number of states pursuing Antarctic programs, increased exploitation of marine living resources, and potential commencement of minerals exploration and exploitation in the Antarctic if a minerals convention is adopted and enters into force.

Human activity in Antarctica should be oriented to minimise impact on the environment. Thus, in general, the Antarctic should not be used to dispose of wastes, and all wastes generated there, with the exception of treated gray water, should be returned to the country of origin, or to countries where they can be properly disposed of. All waste management plants should be continuously monitored to guard against any accidental release of toxic substances to air, soil, ice and water.

At present, operators in the Antarctic are free to abide by, or ignore, waste disposal agreements presently in effect, as well as rules which are applicable in their home countries. Waste management policies and procedures vary widely among those states active in the Antarctic. Even within individual national Antarctic programs, waste management activities are far from uniform. Some of the guidelines and rules promulgated by individual states to govern their national activities overlap, and sometimes conflict with, regional guidelines adopted under the auspices of the Antarctic Treaty by the Antarctic Treaty Consultative Parties (ATCPs).

This statement focuses more attention on the U.S. program at McMurdo than on other facilities. This reflects the fact that more information is available about that facility. There have been significant problems identified with McMurdo, in part because it is such a large station, and to that extent it serves as a test case of how policies and practices can be improved. The U.S. National Science Foundation has indicated an evolving awareness of the need to improve the situation at McMurdo, as well as other U.S. bases, which we welcome. The NSF's initiatives on safety, environment and health issues are examples of this improved awareness. But we submit that there is a long way to go.

A. Legal Framework

1. Global

International concern for the environment of the earth's

non-sovereign regions has led to the conclusion of various multilateral conventions, some of which have bearing for the Antarctic Treaty Area. In particular, several international conventions address issues of marine pollution and the dumping of waste material at sea that are relevant to the legal framework for Antarctic waste management. This relevance arises from provisions in the Antarctic Treaty that reserve high seas rights within the Treaty area, and can be read to imply that high seas responsibilities also exist in these waters.

The ATCPs have not, however, taken steps to specifically apply, implement or modify these international conventions in the Antarctic Treaty context.

a. London Dumping Convention

This Convention obligates the contracting parties "to take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea." To accomplish this, the Convention prohibits or restricts certain listed substances from being dumped into "all marine waters other than the internal waters of states."

b. MARPOL Convention

This Convention seeks "the complete elimination of intentional pollution of the marine environment by oil and other harmful substances and the minimization of accidental discharge of such substances."

c. The UN Convention on the Law of the Sea

While not yet in force, this Convention contains several provisions related to marine pollution and waste disposal. Specifically, signatories are obligated to adopt rules, laws and regulations to prevent, reduce, and control pollution of the marine environment from land-based sources, dumping, and vessel sources. These provisions are meant to reinforce the commitments made by states under other international legal regimes, as well as to underscore the universal responsibility of all states to preserve and protect the marine environment.

2. The Antarctic Treaty System

The ATCPs have utilized the Consultative Meeting process of the Treaty to address environmental and waste management issues. The Agreed Measures for the Conservation of Antarctic Fauna and Flora established the Treaty Area as a "Special Conservation Area." Furthermore, the Agreed Measures call on each participating government to "take all reasonable steps towards the alleviation of pollution of the waters adjacent to the coast and ice shelves."

Beginning at the Sixth Consultative Meeting, the ATCPs have made the topic of "Man's Impact on the Antarctic Environment" a more or less regular agenda item at the biennial ATCMs, from which an evolving series of recommendations has emerged. Recommendation VI-4 recognized the "increasingly urgent need to protect the environment from human interference" and declared that "the Consultative Parties should assume responsibility for the protection of the environment and the wise use of the Treaty area." At that time, the ATCPs recommended that their respective governments "take interim measures to reduce known causes of harmful environmental interference."

Antarctic Treaty recommendations are neither self-executing nor legally enforceable, but are adopted by consensus at the Consultative Meetings, thus creating a degree of mutual obligation among the ATCPs to abide by the rules or guidelines contained in them. It is up to any individual state to interpret the recommendations, to determine what they restrict, prohibit or require in practice, and then to develop implementing regulations and practices.

The legal structure supporting the ATCPs promulgation of waste management policies in the Antarctic is both broad and vague. The ATCPs have used the Consultative process to enact a Code of Conduct that addresses waste disposal issues, although it is not legally binding and is, therefore, unenforceable. More binding arrangements, such as an Agreed Measure, have not been considered, nor has serious consideration been given to to applying other international conventions to the region.

In Recommendation VIII-11, the ATCPs established the Code of Conduct for Antarctic Stations and Expeditions, which specifically addressed waste management issues. However, in keeping with the relatively loose, non-compulsory nature of the Consultative process, the ATCPs are bound to follow the Code of Conduct only to "the greatest extent feasible." The Code of Conduct represents the first attempt at establishing a comprehensive scheme for Antarctic waste management, although it is far from comprehensive and contains no performance criteria.

The ATCPs have recognized the need to revise and update the Code of Conduct in light of the "increasing level and degree of complexity of Antarctic operations" and the likelihood of a "wider range of potentially environmentally damaging substances" being introduced into the Antarctic. The ATCPs have further recognized that advances in technology and logistical capabilities have increased "the feasibility of on-site treatment of human and other waste, and the removal of solid waste, residues and noxious substances from the Treaty area." In this manner, the ATCPs have focused upon on-site treatment and retrogradation as two possible cornerstones of future Antarctic waste management policy.

In Recommendation XIII-4, the ATCPs noted the need to reduce to "the minimum level practicable" the spread of all potential

contaminants introduced into the Antarctic Treaty Area by man" and called upon SCAR for "scientific advice regarding waste disposal procedures and standards that it is desirable to achieve at coastal and inland stations and field camps."

The SCAR report, which recommends a revised Code of Conduct, has been published, and will be the subject of debate at the Consultative Meeting in Paris this October. It is unclear whether the member countries will approve the recommendations. Although welcomed by many environmental organizations, it has been criticized as not going far enough. For example, the Environmental Defense Fund submitted comments on September 2, 1988 and The Antarctica Project provided comments on September 6, 1988.

Remarkably, the SCAR Report does not mention that virtually all stations and field camps have failed to comply with the 1975 Code. Whereas the Code recommends that liquid chemical wastes be treated or removed from the Treaty Area, most bases have just burned such wastes in open pits. Whereas it recommends that emissions from incinerators be monitored, most stations conduct open burns with no emissions monitoring or controls. The Code recommends that solid non-combustible wastes be removed or dumped into deep waters, but many bases discard such waste in landfills along the coast. The 1975 Code contains extremely modest provisions, which environmental organizations find to be inadequate, yet compliance has been very poor. Thus, we have concerns about compliance with an even tougher code absent some serious attention to compliance and enforcement mechanisms.

The formal response of the NSF to the SCAR report has been difficult to obtain. It apparently suggests that the U.S. should seek a clarification of clause 4 of the proposed Code, which states:

[I]n the development of their waste management plans, National Antarctic Operators should, where appropriate, take into account their national environmental standards. Where national environmental standards are higher than those recommended in this Code of Conduct, those national standards should apply.

Footnote 18 of the NSF draft report on the applicability of U.S. laws in Antarctica indicates that NSF opposes the imposition of national environmental standards on U.S. Antarctic activities, referring to the clause as "imprudent and ill-advised." NSF concludes that the mandatory imposition of such standards might do more harm than good.

Some ATCPs have promulgated regulations that closely mirror the existing Code of Conduct. Other ATCPs have begun to move forward with new policies and waste management procedures that reflect a heightened awareness of the environmental impacts of national activities in Antarctica. Most ATCPs appear to be interested in considering modifications of existing practices to

better protect the environment. Numerous studies are either underway or have been proposed in various countries. It should be noted that the information publicly available regarding practices of states varies widely.

A survey of state practice in the Antarctic regarding waste management procedures was carried out by ASOC and some of its members from 1986 to the present, including actual inspections by Greenpeace at some bases. This work reveals four distinct stages utilized in varying combinations by different countries:

- (1) regulation and limitation of materials being exported to the Antarctic,
- (2) storage and disposal of waste through dumping on land or at sea,
- (3) burning of waste, and
- (4) the return of waste to the country of origin (retrograding).

We are attempting to learn the degree to which each of these processes is utilized by Antarctic Treaty Members, but the data made available by the governments has been rather scanty. In particular, statistics about quantities of various types of materials and substances and how they are screened and disposed of seem to be unavailable. In addition, it would be desirable to know much more about the impacts such processes have on the Antarctic environment, and the costs and benefits associated with including such processes in a comprehensive Antarctic waste management regime.

We had hoped that the SCAR committee on waste disposal which prepared the revised Code of Conduct would be able to obtain more information on these points, but their report indicates otherwise.

The following comments on various countries' practices are based on the existing Code of Conduct, since it is the one actually in force at the present time and there is no guarantee that the governments will enact the proposed revised Code. We will discuss the proposed revisions in the Code later.

a. The Regulation of Imported Materials

The first stage in the Antarctic waste management process involves the exclusion or decreased importation of non-desirable materials from the Treaty Area, either because they are inherently dangerous to the environment, or because their future disposal entails environmental or financial costs that could be avoided through non-importation. The Antarctic Treaty expressly prohibits the disposal of radioactive wastes in the Treaty Area, but otherwise is silent as to what materials may be introduced into the Antarctic region and the methods of their

disposal.

The Code of Conduct recommends that: "Every effort should be made to reduce the plastic packaging of products imported into the Antarctic Treaty Area." In addition, the Code of Conduct states: "If possible the use of leaded fuels or fuels containing ethylene bromide and ethylene chloride should be avoided."

Australia, which is in the midst of a rebuilding program for its Antarctic Stations, has adopted a program of controls over the materials being sent to the Antarctic in order to reduce the waste being generated by the Australian Antarctic Program.

The official Expedition Handbook published by the Alfred Wegener Institute, which runs West Germany's Antarctic program, recommends that the importation of plastics, pesticides and chloride hydrogens into the Antarctic Treaty Area be avoided and/or reduced as far as possible.

The New Zealand Antarctic Division has, in the past, engaged in a degree of pre-screening by giving preference to commodities packed in recyclable containers, while discriminating against undesirable packaging materials and containers, thus minimizing the build-up of unwanted materials at Scott Base.

b. Land Dumps

The disposal of waste on the Antarctic continent and in the surrounding seas is now practiced by most all the nations operating in the region. Three methods are primarily used: (1) collection of solid waste in dump sites on the continent, (2) dumping of solid waste in the waters of the region, and (3) piping of sewage either into the ice shelf or into the surrounding waters.

According to the Code of Conduct, "waste should not be buried," except at inland stations or camps in certain situations. The actual practice of the various ATCPs differs widely. Some states utilize land-based dump sites, while others use a variety of other methods for the disposal of their solid wastes. Several ATCPs have indicated that their Antarctic programs do not make use of solid waste dump sites in the Antarctic. These states are: Argentina, China, the Federal Republic of Germany, and Uruguay. Based on the Greenpeace inspections, these claims are dubious in some cases.

At the Argentine Deception Base, there were leaking drums of fuel. At the Ardley Island refuges there were several 200-litre barrels containing rubbish (rusty cans and broken bottles), with no lids, so the rubbish was easily scattered. Wood was strewn along the coastline, and a large number of broken bottles were lying on a moss bed. At Camara, which is used only occasionally, there was a large mound of rubbish, including plastics, timber, glass, coiled wire and cans, apparently thrown straight out the window. At Jubany, batteries were dumped near the dump site,

there was no protection from wind around the dump, kitchen scraps are dumped outside for birds to feed on.

Uruguay's Artigas Base does have a burning pit (which contained plastic bags, food, etc. that birds use for a feeding ground), and a rubbish dump (which contained all sorts of junk, including plastic pipes). Wind scattering was an obvious problem. Several small lakes or pools behind the base had larger tracks running through them. Plastic bags dumped in one of the streams.

At Chile's Teniente Marsh Base, there is a dump containing fuel drums and metallic remains. The President Aguirre Cerda Base, which is abandoned, is an eyesore. A small melt lake was partially filled with rubbish and skuas and gulls were feeding on it. The dump included tires, plastics, and rubber, and there was evidence these materials had been burned. The dump site was formerly part of the SPA. At the Captain Arturo Prat Base, there is evidence of dumping and burning rubbish over a very wide area. Materials dumped there included plastics. The area surrounding the dump was covered with moss, so it is likely that the dump area was once covered as well. Wind scatter was also a problem. There were empty drums in the lake. Food scraps were stored in open drums.

Australia, which in the past has utilized land-based dump sites at its Antarctic stations, has closed these dumps in connection with a rebuilding program that includes a new waste management system. The waste materials currently stored in these dumps, consisting mainly of non-combustible and partially burnt material as well as incinerator residue, is being returned to Australia during the course of the next several years. In the future, all non-burnable waste will be returned to Australia for disposal, along with all incinerator residue.

The South African Antarctic program buries solid human waste, kitchen slop, residue from combusted waste and compacted cans, bottles and plastics in the ice shelf near SANAE Station and at the Sarie Marais field site.

The Dumont D'Urville French base conveys kitchen refuse and solid waste to the edge of a cliff by monorail, which is automatically dumped down the cliff face into the ocean.

During the mid-1970's, New Zealand operated an extensive retrogradation program and made little use of the Winter Quarters Bay dump operated by the U.S. near Scott Base. Since the early 1980's, however, the New Zealand retrogradation program has fallen off, and increasing use has been made of the Fortress Rock dump site operated by the U.S. for McMurdo Station.

Greenpeace's Technical Report at Scott Base indicates that sampling heavy metals, including cadmium, shows levels appreciably elevated, and significant contamination of soils in some areas. Another sample showed a high silver level, indicating more than a minor accidental spillage of photographic

chemicals.

c. Ocean Dumping

The Code of Conduct allows for non-combustible materials, with the exception of batteries and other toxic materials, to be disposed of in Antarctic waters. Batteries, along with harmful lubricating oils, plastic and rubber products, and waste containing isotopes are to be removed from the area. Logically, that means they should not be disposed of in the waters of the Antarctic Treaty Area.

Thirteen ATCPs are, moreover, parties to the London Dumping Convention, which provides a much more detailed listing of materials proscribed from ocean disposal. Fifteen ATCPs are signatories to UNCLOS III, which contains restrictions on ocean dumping that, like the convention itself, were formulated as part of an overall consensus among virtually all existing states. UNCLOS III has yet to receive the necessary number of ratifications to bring the convention, and its dumping provisions, into force. The Declaration of Principles Governing the Seabed and the Ocean Floor and the Subsoil Thereof, Resolution 2749 of the U.N. General Assembly passed December 17, 1970 may also have relevance for the Antarctic.

The Agreed Measures, the Seals Convention, and the CCAMLR all exhibit a concern for the marine environment of the Antarctic, but do not specifically address waste disposal issues. Likewise, MARPOL restrictions on harmful discharges from shipping provide less protection for Antarctic waters because so few of the ATCPs have become parties to that treaty. Nonetheless, MARPOL provides a good framework for regulation of vessels in the Antarctic by those states that are parties, and other states could be encouraged to join.

Solid waste at Chile's Marsh/Frei Station is placed in metal drums and dropped from C-130's, while at Poland's Arctowski Station, all non-sewage, burnable waste is incinerated and the ashes are stowed in 55 gallon drums to be dumped at sea. Non-burnable waste generated at the UK's Farraday Station is disposed of primarily through dumping at sea. According to informal conversations with numerous individuals, most ATCPs dump some quantities of solid waste at sea within the Antarctic Treaty area, in a variety of ways.

d. Sewage

The Code of Conduct recommends that human waste, garbage, and laundry effluents, "where possible", be macerated and flushed into the sea. In addition, the Code states that large quantities of photographic liquids should be treated for the recovery of silver, with the residue being flushed into the sea, but provides no definition of "large" or standards for waste.

Waste water and sewage at Argentina's General Belgrano II

Station, West Germany's Georg von Neumayer Station, and South Africa's SANAE III Station is piped or pumped off the site and into the continental ice-cover.

Sewage at Argentina's Jubany Station, Chile's Marsh/Frei Station, China's Great Wall Station, the UK's Farraday Station, and the U.S.SR's Molodezhnaya and Bellingshausen stations is either piped or dumped, untreated, directly into nearby Antarctic waters. However, the UK has now installed a sewage maceration plant at Farraday Station. At the Dumont D'Urville French base, waste chemicals from the laboratories and photography darkroom are passed by overhead pipe, to fall eventually into the sea on the northern side of the island. Untreated sewage is released into the sea nearby.

The Australian rebuilding program includes the construction of a biological sewage treatment plant at Casey Station, which has been completed. This would be in contrast with Davis Station, where sewage is burned in oil-fired processors. However, even when installed, the sewage treatment plant at Casey will still outfall into the sea. Poland's Arctowski Station uses a five-stage sewage filtering system and monitors the effluent as it enters Admiralty Bay.

At the New Zealand base high levels of zinc in effluent samples from sewage outfall suggests that it is a combined industrial and domestic effluent. The copper level in sewage effluent in one sample was 50 times higher than would be expected from sewage alone, and is comparable to what would be associated with industrial activity.

The impact of direct sewage disposal into Antarctic waters, as well as the need for additional, regular monitoring programs, is evidenced by scientific studies undertaken in the Antarctic. For example, benthic organisms near Syowa Station are polluted considerably by PCB and slightly by DDT from station activities, although the PCB and DDT levels in the fish analyzed are low compared with those in other oceans. The scientists who conducted the research at Syowa recommended that, in order to prevent pollution from station activity, stricter waste disposal procedures be applied.

e. Burning and Incineration

Many ATCPs either burn waste material utilizing uncontrolled processes (i.e. open air combustion), or have installed incinerators at their bases to dispose of combustible wastes. The Code of Conduct recommends the incineration of wood, wood products, paper, and animal carcasses. In addition, the Code suggests that when incinerators are used, the effluents be monitored.

It appears that virtually every station burns plastics and/or uses plastic garbage bags for trash dumped at sea, contrary to recommendations in the existing Code of Conduct.

Most combustible waste at Argentina's Jubany Station, China's Great Wall Station, Japan's Syowa Station and South Africa's SANAE III Station is collected and burned. The Dumont D'Urville French base burns combustible wastes in the open, and also uses incinerators. There is little available information about the definition of "combustible" used at these bases, or the quantities disposed of. Burnable trash at Farraday Station (UK) and the Soviet Union's Bellingshausen Station is incinerated, but there are no statistics available about the composition of this trash.

New Zealand replaced the Harco Industrial Incinerator at Scott Base, which utilized an "uncontrolled" incineration process, with a new Warren Controlled Air Incinerator during the 1986/87 summer season. The Harco incinerator, installed during the 1972-73 season, is used to dispose of all of Scott Base's burnable waste, using diesel fuel and waste oils as fuel. In contrast, the Warren incinerator uses an air-starving process that gasifies the volatile part of the waste, and then completely burns this gas in the secondary combustion stage. This method of incineration, more commonly referred to as waste distillation or pyrolysis (the burning of materials in the absence of oxygen), is meant to reduce stack emissions, and thus, it is hoped, to reduce environmental pollution.

The rebuilding program for the Casey, Davis and Mawson stations operated by the Australian Antarctic Division includes the installation of a new waste management system. Like New Zealand, Australia has installed two-stage, high-temperature Warren incinerators at each of these stations. The new incinerators burn organic matter, paper and wood products and most plastics. Non-PVC plastics are being burnt, while any doubtful plastics and other non-burnable wastes are supposed to be returned to Australia, as are incinerator residues.

Four key points are raised by the intended introduction of pyrolysis technology into the Antarctic at the present time. First, just as with more traditional forms of incineration, there is a great potential for incomplete burning, chemical reformation, and toxic air emissions. Addition of air at a later stage in the process may alter the relative proportions of the chemicals formed, but does not guarantee that they will be of lower toxicity. This is of particular concern given that New Zealand and Australia intend to burn some plastics in their new incinerators. Second, pyrolysis, like any other burn technology, will leave behind a residue that is undeniably more toxic than the source waste. Ash from high temperature hazardous waste incineration, for example, is treated as hazardous waste itself, and is appropriately disposed of in landfills at hazardous waste sites. The ash is produced as the result of incomplete combustion. The management and disposal of the residue from pyrolysis incineration is an important environmental concern.

Third, the technology incorporated by the Warren incinerator has been rigorously tested. Pyrolysis was experimented with in

the U.S. in the mid-1970s, but is not in use today in the U.S. Thus, a rather slim data base appears to exist on which to support claims that the technology is either environmentally benign and/or superior to current methods of waste incineration practiced in the Antarctic.

Fourth, it is unclear how burnable plastics will, in practice, be segregated from PVC and other harmful plastics, which raises the possibility that practices may differ from policies.

Regarding the Code's recommendation that all burning of wastes be monitored scientifically, there is insufficient data on the level of compliance by particular countries on which to base any firm conclusion, but this does appear to be an area that deserves particular attention.

f. Retrograding

The Code of Conduct recommends that batteries, harmful lubricating oils, plastics, rubber products and waste containing isotopes be removed from the Treaty Area.

The Australian Antarctic Division is in the process of installing large trash compactors at each station. It is assumed that non-burnable solid waste will be compacted, and then containerized for return to Australia. The long-term charter of the Icebird provides for the possible return to Australia (RTA) of large quantities of waste by containerization. Containerization has two main advantages. First, it allows waste to be treated as unit cargo, and second, waste can be stored as it is generated or collected, and effectively contained against dispersal. Containerization allows for the maximum amount of waste to be shipped and makes for easy handling when backloading.

Argentina's Marambio Base uses an industry-sized trash compactor for non-burnable wastes, which are baled and retrograded to Argentina. Non-combustible solid waste at Argentina's Jubany Station is assembled in drums and removed from the area by ship.

Non-burnable waste at China's Great Wall Station is transported out of the area, although it is unclear exactly how or where it is disposed of. Non-burnable solid waste is retrograded from West Germany's Georg von Neumayer Station in containers. The West German Antarctic program's policy is to retrograde all harmful and non-burnable waste, although precise statistics are unavailable. At Syowa (Japan), non-biodegradable refuse is compacted and retrograded to Japan. Chemical wastes are removed from the Treaty area.

For several years (1972-77), New Zealand retrograded scrap metal, glass, plastic and other non-burnable waste material from Scott Base. This waste was transported by sea in February and by

outbound empty U.S. aircraft in October. Recyclable materials were sold to manufacturers or recycling plants in Canterbury to raise funds for the Scott Base Social Club, while the remaining waste was sent to a Christchurch dump.

As mentioned previously, in recent years, New Zealand has made increasing use of the Fortress Rock dump operated by the U.S. near McMurdo Station. At the same time, there has been a falling-off in the amounts of waste material being retrograded. This drop coincided with complaints from the U.S. Navy regarding the cargoes of crushed cans and smashed bottles being retrograded by New Zealand aboard U.S. aircraft, as well as difficulties with Christchurch dump administrators over the deposit of the waste. This latter difficulty has been compounded by the Ministry of Agriculture and Fisheries (Agricultural Quarantine Service), which has classified waste from the Ross Dependency as "foreign" in origin.

Empty fuel drums, building materials, old parts and supplies, old vehicles and batteries are returned to South Africa. At the Sarie Marais field station, certain items are returned to SANAE for export to South Africa. Uruguay, because of the small size of its Antarctic operation, is able to retrograde all the non-burnable rubbish generated by its activities. Scrap metal is sent back to the U.S. SR from Bellingshausen Station.

3. U.S. Waste Management Policy

United States policy-making for Antarctic affairs is formally vested in the Antarctic Policy Group (APG), an inter-agency committee composed of representatives from the Department of State, the Department of Defense (DOD), and the National Science Foundation (NSF). Other Federal agencies participate on an ad hoc basis. The State Department, in addition to chairing the APG, acts as the lead agency during negotiations related to Antarctic affairs (e.g. Seals Convention, CCAMLR, minerals negotiations).

The United States Antarctic Program, operated by the National Science Foundation (NSF), consists of scientific and logistical activities. The NSF directly administers the U.S. Antarctic Research Program (U.S.ARP), which covers most of the scientific activity conducted or supported by the U.S. in the region. The U.S. Navy, through Operation Deepfreeze, provides ground, sea, and air support to the U.S.ARP on contract, as does the U.S. Coast Guard, which operates two icebreakers serving McMurdo and Palmer Stations as well as providing seaborne research platforms for the U.S. program. The NSF employs a civilian contractor (ITT/ANS) for additional logistical support at McMurdo Base and at the Palmer, South Pole and Siple stations. The National Oceanic and Atmospheric Administration (NOAA) also operates ships in the Antarctic for research purposes in connection with the CCAMLR.

U.S. Antarctic activities are not presently governed by any single, comprehensive set of guidelines for the management and disposal of waste material generated by the program. The U.S. government, as a state party to the Antarctic Treaty, is bound to obey its provisions and the U.S. laws promulgated to give them domestic effect. Furthermore, as an ATCP, the U.S. has adopted recommendations formulated through the consultative process that deal with waste management issues. Last, several pieces of U.S. legislation mandate waste management rules and regulations, which have policy implications for the U.S. Antarctic Program and its participating Federal agencies.

a. The Antarctic Conservation Act

In 1978, the U.S. Congress passed the Antarctic Conservation Act in order to implement the Agreed Measures for the Conservation of Antarctic Fauna and Flora. The purpose of the Act is to provide for the conservation and protection of the fauna and flora of Antarctica and its dependent ecosystems. The Act is relevant to waste management policy because it prohibits, with some exceptions, the discharge or disposal of any pollutant within Antarctica by U.S. citizens.

The director of the NSF is required by the Act to: (a) designate as a pollutant any substance which is liable, if introduced into Antarctica, "to create hazards to human health, to harm living resources or marine life, to damage amenities, or to interfere with other legitimate uses of Antarctica" and (b) specify those actions which must be taken in order to prevent or control the discharge or other disposal of pollutants in Antarctica.

Pursuant to the provisions of the Antarctic Conservation Act, the NSF issued regulations to conserve and protect animals and plants native to Antarctica. The NSF, however, did not include in these regulations measures to restrict the discharge and disposal of pollutants in Antarctica, indicating that such measures would be forthcoming at a later date. To date, the NSF has neither defined any substances to be pollutants within the meaning of the Act, nor has it promulgated any regulations covering the disposal of pollutants in the Antarctic Treaty area.

b. Implementation of the Code of Conduct

The NSF issued an internal administrative directive following the U.S. approval of the Code of Conduct contained in Recommendation VIII-11, which sets out recommended procedures for waste disposal. The NSF directive differs in some important respects from the Code of Conduct adopted by the ATCPs and approved by the U.S. For example, the Code of Conduct states that: "All plastics and rubber products should be removed from the Antarctic Treaty Area." The NSF directive, in contrast, stipulates that such action need only be taken "where feasible", and allows for the disposal of plastics in landfills as an alternative.

The U.S. implementation of the Code of Conduct, as reflected in the NSF directive, also contrasts with the policies of some ATCPs, which have incorporated the Code verbatim into their waste management regulations, and with countries that have gone further than the Code, such as West Germany and Australia. Germany removes from Antarctica all non-burnable waste except for carcasses of imported test animals, and Australia has developed a model retrogradation program. Of course, as noted above, each country has wide scope in interpreting and implementing recommendations such as the Code.

Currently, there is no single, comprehensive policy on the part of the U.S. for the screening of Antarctic-bound materials, although there are a number of informal directives and contractual terms between the NSF and its contractors--the Navy, Coast Guard and ITT/ANS. The NSF conducts "broad supervision" over its contractors where materials importation is concerned, but that supervision has not extended to establishing firm criteria, incentives, and mandatory regulations for limiting undesirable products.

The NSF has recognized the impact that the importation of large quantities of logistical support material may have on the Antarctic environment. In the programmatic EIS prepared in 1980, the NSF concluded that the "addition of foreign materials to a pristine environment" was a significant environmental impact of the U.S. Antarctica Program. Each year, in fact, more than 2000 tons of cargo and food, as well as 5 million gallons of petroleum products, are shipped to Antarctica in support of the U.S. program. Statistics do not appear to be available on how much material, by category, is disposed of in various ways or retrograded.

According to current U.S. policy directives to contractors and scientists, laboratory chemicals that are reactive are neutralized prior to disposal, and all radioactive research materials are stored in containers and returned to the U.S. for disposal. Recently some plastics have begun to be stored, pending a revised official policy on disposal. For example, plastics from Palmer station are required to be segregated and stored for the time being.

The U.S. Antarctic Program, through the NSF contractor ITT/ANS, operates a large solid waste dump site at Fortress Rock to service McMurdo Station. It also has been used by the New Zealand Scott Base.

In the U.S., solid waste disposal is subject to general guidelines promulgated by the EPA pursuant to the Solid Waste Disposal Act. The formal guidelines established by the NSF to govern solid waste disposal in Antarctica, however, were meant to implement the Antarctic Code of Conduct, and in no way approximate the scope and detail of the Solid Waste Disposal Act.

The Fortress Rock dump site is far from meeting the commonly recognized standards for an EPA-approved sanitary landfill. The EPA defines a sanitary landfill as:

[A] method of disposing of solid waste on land without creating nuisances or hazards to public health or safety, by utilizing the principles of engineering to confine the refuse to the smallest practical area, to reduce it to the smallest practical volume and to cover it with a layer of earth at the conclusion of each day's operation or at such more frequent intervals as may be necessary.

At Fortress Rock a number of practices engaged in are outside the EPA guidelines, but nevertheless are allowed by the NSF's interpretation of the Code of Conduct. Open burning is used in order to reduce the large volume of combustible waste materials generated by McMurdo Station, a procedure which, by definition, would be prohibited at a sanitary landfill. Because of the periodic burning of the dump and the limited availability of heavy tracked equipment, regular compacting of the solid waste at Fortress Rock does not occur. In addition, the standard practice of covering over the solid waste with earth is made difficult in the Antarctic due to the scarcity of cover materials and the difficulty in storing them for future use. Last, the establishment of a vegetative cover for the completed landfill, required by the EPA, is problematic in the polar climate of Antarctica, and is specifically prohibited in the Antarctic Conservation Act.

In sum, the waste management operation at Fortress Rock more closely resembles the traditional "open dump" than a sanitary landfill. An open dump is defined by the EPA as a

land site at which solid waste is disposed of in a manner, generally involving burning, which does not protect the environment and is exposed to the elements, vectors, and scavengers.

Clearly, if environmental protection is a primary goal of the U.S. waste management program in the Antarctic, then the operation of an open dump at Fortress Rock, as opposed to a modified sanitary landfill, would appear to be counterproductive. The argument is made, however, that operation of a sanitary landfill in the Antarctic by standard EPA-approved procedures is neither practical nor economically feasible.

Deviations from the EPA guidelines are said by NSF spokespersons to be justified by the fact that overall waste disposal procedures developed for domestic landfills are not suited to the Antarctic environment. For instance, EPA regulations requiring daily soil cover and the planting of vegetative cover over the completed landfill are neither necessary nor possible in the Antarctic, where scavenging animals are said not to be a problem, waste dispersal by wind is said to be at a minimum, and available vegetation extremely fragile.

These reasons, added to the harsh operating conditions and difficult logistic problems of the Antarctic, are put forward in order to support the continued operation of an open dump at Fortress Rock, as opposed to a sanitary landfill. These statements ignore the reality that scavenging birds are numerous, the wind scatters materials from the dumps quite widely, and open burning causes air pollution. Depending on what substances are being burnt, there can be quite harmful impacts on the environment.

In the opinion of the NSF, the McMurdo landfill is operated "in accordance with environmentally acceptable procedures." Furthermore, the NSF contractor has stated that the U.S. "is in full compliance with the Code of Conduct...and is in concurrence with the spirit of generally sound environmental practices." The fact that the U.S. and other countries are taking steps to clean up old dump sites and adopt new policies and procedures belies the statement.

At Palmer Station, hazardous materials such as batteries and tires are supposed to be segregated and retrograded via McMurdo, plastics are supposed to be segregated and are being stored pending a new policy. Most solid waste is compacted and retrograded to Chile, as of the 1988-89 season, on a trial basis. At South Pole station all waste except hazardous substances is buried in the ice. Field camps in the Dry Valleys retrograde all waste. Camps in the snowfields or glacial areas follow different practices depending on their size. Large camps generally bury their waste in snow pits. Smaller field parties will retrograde solid waste but dispose of liquid waste in snow pits.

Until the early 1980s, nearly all solid waste generated at McMurdo Station was staged by the U.S. on sea ice in Winter Quarters Bay. Around this time, however, after successive years when the ice did not move out to sea, the waste began to accumulate closer and closer to shore. These changes in ice conditions left the waste material dumped onto the ice in the Bay "permanently grounded." In December 1983, an attempt to sink the grounded waste material through the use of explosives failed. After 1981, the U.S. began to dispose of solid waste at the Fortress Rock land dump site, but continued to ocean dump items such as heavy machinery and waste metals. Theoretically, all heavy equipment dumped into the ocean is supposed to have been emptied of all oil, lubricants, batteries and tires.

Inorganic litter on the bottom of McMurdo Sound, dating from the inception of the program up to about 1984, consists of fuel lines, barrels, clothing, tractors, tires, thousands of beer cans, and many other types of trash. The most detrimental effect of this inorganic litter is the covering of the ocean bottom, which tends to kill the sponges and other benthic life. The introduction of plastic litter is of especial concern, since it will not biodegrade and will kill all organisms beneath it. In addition, an old petroleum spill has been reported to be generally intact on the bottom. According to Paul Dayton's 1983

letter to Dick Williams of NSF:

In 1974 we found WQB [Winter Quarters Bay] to be essentially dead, the sediment so full of DFA [diesel fuel additive] it almost appeared combustible! Clearly there was a massive spill of some sort and I doubt if that amount of DFA will be broken down in the near future. There is a sill which much reduces currents in WQB, and it is probably fair to say that the benthos is biologically dead already.

The source of this fuel oil spill has never been determined, although some NSF personnel believe it could have resulted from the practice of dousing the items to be disposed of with fuel oil and burning them.

Some of the scrap metal from Palmer Station is deposited in the deep ocean, but statistics on the quantities and types are not available. As mentioned above, compacted solid waste from Palmer is dumped in the ocean south of 60 degrees South latitude.

The NSF applied to the EPA for an ocean dumping permit in 1981, but it has never been acted upon. NSF has indicated that it was advised informally by EPA that practices consistent with the terms of the application would be acceptable pending further EPA action. Two years ago the NSF directed its civilian contractor and the Navy to cease dumping of inorganic waste materials into McMurdo Bay. This decision has not been formalized in a directive, nor is the scope and date of implementation known. It is reflected in correspondence with the Environmental Defense Fund (EDF) and a newspaper article. In a letter dated June 22, 1987 to Bruce Manhiem (EDF), Erich Bloch (NSF Director) stated:

The National Science Foundation has told its contractor, ITT Antarctic Services, and the U.S. Naval Force Antarctica that this practice is to be discontinued. Scrap that would otherwise have been deposited on the ice is to be returned to the United States.

A piped sewage collection system, which flushes waste to the sea, was constructed at the McMurdo Station in the mid-1970's. Originally, some 30 buildings were served by the system, with the remainder either having no toilet facilities or using 55-gallon 'U-barrels' to collect sewage. The sewage system has been expanded since then and will soon serve all of the living quarters at the Station. Presently, all sewage is collected and piped, untreated, by a gravity system to an outfall located at the eastern side of Winter Quarters Bay. A new, consolidated sewage outfall is to be relocated to deeper water.

The organic enrichment resulting from sewage and local sinking of garbage has the possibility of shifting the ecological balance of the benthic community with long-range consequences that could be devastating.

According to the long-range plan for McMurdo, the liquid waste management system is scheduled to be overhauled. When completed, the plan envisions a number of integrated steps that should reduce the impact of sewage disposal on the waters surrounding McMurdo Station. First, all facilities occupied on a daily basis will be connected to the sewage system, thus eliminating the use of 55-gallon drums for the collection and disposal of liquid waste. Second, disposal units are to be installed in the kitchen and dining areas to eliminate solid matter at the source. In addition, a maceration plant was supposed to be installed in order to process solid waste materials flushed into the sewage system, and thus aid the dispersion of the effluent, minimizing benthic settlement after outfall into the ocean. Brine from the water plant is also to be used to thin the sewage outflow and thus facilitate its dispersal into the ocean. Third, non-human waste, such as chemical and oil wastes, currently are separated or neutralized at their source, and are not disposed of in the sanitary waste system.

Our understanding is that much of this work remains to be done, and we would like to see a full report from NSF. As for monitoring of the effluents at McMurdo, NSF publicly says that a detailed chemical analysis of the effluent has never been made, but in 1983 Raytheon reported to NSF that cadmium and chromium output were exceeding U.S. EPA standards. Greenpeace's most recent analyses confirm those elevated levels.

In a 1988 Technical Note, "Trace Metals in Soil and Effluents From Antarctica", Greenpeace reported that:

Samples taken of sewage effluents at both McMurdo and Scott Bases showed appreciable discharge of cadmium. In the case of Sample 004CA:87/88 from a temporary discharge hose, the value of 0.55ppm is in clear breach of standards set for industry in European countries....

The results suggest that appreciable anthropogenic mobilization of heavy metals is taking place in the areas of Scott and McMurdo bases. This has resulted in significant contamination of soils in some areas. Effluents from the bases also contain significant amounts of metals.

The toxicological implications of metal contaminant mobilization remain unevaluated in the area but may have implications for local bird populations in terms of food chain transfer.

Liquid waste from Palmer station is discharged into the sea. At South Pole station, all liquid wastes, unless hazardous, are buried in the ice, leading some observers to reflect that the bases may be sinking into the ice as a result. All liquid wastes at field camps other than in the Dry Valleys are buried in snow pits.

The NSF contracted a study on the installation of incinerators at McMurdo. Although the study recommended the use of incinerators in tandem with compactors and balers, the NSF apparently has decided not to act on these findings for the time being, partly for technological reasons. NSF personnel have expressed skepticism about the efficacy of the incinerators now being installed by Australia and New Zealand.

The McMurdo dump is still burnt regularly, including plastics, according to Greenpeace's most recent inspection. Trash is brought to the dump in plastic bags. The NSF acknowledged in the SCAR survey that plastics are disposed of in the dump.

There is no active component in the U.S. Antarctic Program to monitor air emissions, including the periodic burnings at the Fortress Rock dump. According to the Sanitary Landfill Report, the impacts of the dump burnings are small and "localized." Certain wooden items and a small amount of paper are burned in the area near the Palmer station heliport.

The U.S. program has, for the last several years, retrograded empty gas bottles, obsolete and waste oil, various other waste liquids, batteries, and tires by air to either New Zealand or the U.S., but no statistics are available about what is returned, and how quantities of particular items, such as tires and batteries, compare to quantities shipped to Antarctica. There also is some doubt about compliance with the policy, based on the photographs taken by Greenpeace in starting in February 1987 at McMurdo. Those photographs show all sorts of barrels and debris tumbling into the sea, including one vehicle chassis with at least six tires visible.

A primary difficulty associated with the retrogradation of materials from the Antarctic by air concerns the loading of the aircraft. Airborne materials have to be containerized and securely stowed aboard aircraft in order to ensure safe operation of the plane. Likewise, an aircraft has to be balanced so as not to endanger its take-off and landing capabilities. Under Antarctic conditions, and given the manpower and equipment in place at McMurdo, for example, this is a difficult and time-consuming task. In addition, the airfield at McMurdo is an ice runway, not concrete, an added consideration when composing aircraft cargoes.

A further point is that the Navy assigns priority status on outbound aircraft to items that must be repaired and returned to Antarctica. Although no comprehensive statistics are available covering the composition of outbound cargoes and space utilization, the impression is given that the Navy places highest priority on fulfilling its supply and maintenance support missions, and schedules its aircraft and other vessels and their cargoes accordingly.

Field camps in the Dry Valleys retrograde all waste,

which then is disposed of as discussed above, depending on which station it is taken to. Camps in the snowfields or glacial areas follow different practices depending on their size. Large camps generally bury their waste in snow pits. Smaller field parties will retrograde solid waste but dispose of liquid waste in snow pits.

c. NSF Report on Applicability of U.S. Laws in Antarctica

Stung by the NGO reports prepared by the Environmental Defense Fund, Greenpeace International and ASOC, NSF spent months studying its compliance with U.S. law. Its draft report was released in late July, 1989. Several NGOs have commented on the draft. Although commending NSF for trying to meet its responsibilities, all were highly critical both of the process employed by the NSF in conducting the study, and of the conclusions reached. Those comments, by The Antarctica Project, Environmental Defense Fund, and Greenpeace, are attached as Appendices 2, 3 and 4.

The intention of the NSF report is to determine (1) which environmental laws apply to U.S. Antarctic activities, (2) whether the U.S. program is currently in compliance with those laws, and (3) provide recommendations for bringing NSF into full compliance with both those laws and what are described as "sound principles of pollution control, wildlife conservation, and waste management". We have been supportive of this review taking place, believing that these questions are very important. But we urged that the study formally include the active participation of other agencies, including CEQ, EPA, NOAA, and the Marine Mammal Commission, and also that the public be fully involved in the consideration of these important questions.

As noted in our comments to NSF, the question of which U.S. and international laws apply to activities in the Antarctic should not be addressed by NSF alone, but by the Antarctic Policy Group and other elements of government with expertise bearing on that question. CEQ, with its responsibilities for implementation of NEPA and the Executive Order on activities abroad obviously has an important role in this inquiry. The Environmental Protection Agency, given its broad mandate to enact regulations for various statutes and to enforce statutes and regulations, should have an important role. The State Department, the Commerce Department, the Interior Department, and the Coast Guard, which negotiate international agreements for the U.S., should have a major role. The NSF, in contrast, lacks the institutional expertise to address these questions.

We believe the NSF has construed many provisions of U.S. law too narrowly in attempting to evaluate their application to Antarctic activities, and that too little effort was made to evaluate whether U.S. laws ought, as a matter of sound policy, to be applied in the Antarctic.

The NSF report confirms many of the concerns raised in "On Thin Ice." As outlined in EDF's comments, these include NSF's failure to: "(1) issue mandatory pollution control regulations required more than a decade ago by the Antarctic Conservation Act; (2) prepare environmental impact assessment guidelines and environmental statements pursuant to E.O. 12114 and the National Environmental Policy Act; (3) implement mitigating measures identified in its 1980 programmatic impact statement; (4) at least macerate wastewater discharges as required by the 1975 Code of Conduct on Waste Disposal; (5) discontinue use of a landfill at McMurdo Station as required by the 1975 Code of Conduct; (6) ensure that oil pollution does not result from leaking storage tanks on the continent or stranded vessels at sea; (7) control emissions from open pit burns, power generators or vehicles used at research stations; (8) comply fully with applicable reporting and monitoring requirements under E.O. 12088; (9) extend comprehensive protection to Antarctic wildlife under the Antarctic Conservation Act; and (10) generally comply with sound U.S. environmental policy embodied in various environmental laws such as the Clean Water Act, Clean Air Act, and Resource Conservation and Recovery Act (RCRA)."

The NSF report acknowledges that the proposed Code calls for cleanup of abandoned work sites. For the U.S., this will include Marble Point Camp, Cape Hallett Station, Old Palmer Station, Siple Base, Byrd Station, Plateau Station, Eights Station, and East Base. We look forward to seeing the detailed proposal for those cleanups.

We must confess to being seriously disappointed with NSF's conclusions about compliance with the conservation provisions of the Antarctic Conservation Act. The report assumes that the mere issuance of regulations "fully implemented its conservation rule-making responsibilities" under the Act. As EDF has shown in "On Thin Ice", however, there are many other important aspects of NSF responsibility. Section 12 of the Act requires that

each federal department or agency whose activities affect Antarctica shall utilize, to the maximum extent practicable, its authorities in furtherance of the purposes of the Act....

Those purposes require NSF

to provide for the conservation and protection of the fauna and flora of Antarctica, and of the ecosystem upon which such flora and fauna depend....

NSF should be carrying out a systematic evaluation of areas that deserve protection as "Specially Protected Areas", especially given SCAR's 1987 recommendation that "consultative parties suggest to their governments that measures be taken to encourage the submission of proposals for additional protected areas."

The report fails to acknowledge that NSF has not adequately

governed entry into protected areas or the taking of native species designated under the Act. Permits for entry into SPAs are supposed to be issued only when "there is a compelling scientific purpose for such entry which cannot be served elsewhere." Individuals are supposed to be allowed to take "native species" only to provide specimens for scientific study or scientific information or for museums, zoological gardens, or other educational or cultural institutions or uses. Yet the evidence shows that NSF has handed out permits in other cases.

The report erroneously concludes that NSF has met its non-discretionary rule-making responsibilities under Section 6 of the Antarctic Conservation Act, other than pollution control regulations. But NSF is required to "specify those actions which must, and those actions which must not, be taken within Antarctica in order to protect, in accordance with the applicable provisions of the Agreed Measures, each native species designated under [the Act]." As EDF points out in its comments, Article VII of the Agreed Measures contains provisions to reduce harmful interference with Antarctic wildlife, which have not been extended to U.S. citizens. Harmful interference arguably "allowing dogs to run free; flying aircraft, driving vehicles, and discharging firearms near bird and seal colonies; or disturbing bird and seal populations during the breeding season by persistent attention from persons on foot". (EDF Letter dated August 25, 1989)

As outlined in the Project Blueprint document prepared for the new Administration last October, we make the following recommendations:

1. The Director of the NSF Division of Polar Programs, working with the Administrator of EPA and other members of the Antarctic Policy Group, should develop a comprehensive program to fully implement the Antarctic Conservation Act (ACA), to regulate the direct and incidental taking of Antarctic wildlife, protect internationally designated sensitive areas, eliminate air and water pollution, monitor key environmental parameters to detect adverse impacts, and ensure full compliance with all applicable U.S. and international environmental obligations.
2. The Director should also design and carry out a thorough program for cleaning up U.S. facilities and portions of the environment adversely affected by prior U.S. activities, and for (1) minimizing waste generated in Antarctica, (2) improving waste management on the continent, and (3) retrograding waste materials to the greatest extent possible.
3. The Director should ensure that the program is run in full compliance with the law in the future. This will require the issuance of new regulations and the establishment of inspection, assessment and monitoring mechanisms. The Director should seek public review and comment on the legal analysis now under preparation by the Foundation's Office of General Counsel, to ensure that all laws have been properly considered with

respect to their application to the U.S. Antarctic Program.

In our view, the Report from NSF puts the ball squarely in Congress' court, in concluding that unless there is specific statutory language in a statute about its applicability to Antarctica, then it will be presumed not to apply. This is a sort of "no man's land" approach that is unsuitable for the special situation of Antarctica--functionally a global commons which a small group of nations is managing in essentially a trustee capacity.

B. Beginnings of a Model Program

NGO environmental organizations have been putting forward a model program for the past four years. It draws upon current policies and practices in order to suggest interim and longer term measures to improve Antarctic waste management, including institutional changes to ensure the long-term protection of the Antarctic environment against degradation caused by the disposal of waste materials in the region. Two years ago our recommendations for a model program included thirteen points, a number of which are addressed in the proposed new Code.

The combined strategy of compacting and retrograding wastes to the country of origin and installing effective sewage treatment facilities may form the beginnings of a model waste disposal program. High-temperature incinerators, if proven effective outside the Antarctic, could play a role in a responsible program, but only on the conditions that (1) no hazardous or potentially hazardous materials (such as plastics) are allowed to be burned, and (2) that a careful effluent monitoring program is carried out.

Bearing in mind the cooperative mandate of the Antarctic Treaty, it would make sense for the ATCPs to convene a meeting of national Antarctic program managers, logisticians and waste management experts to discuss their respective situations, to evaluate model elements of existing programs, and to develop a long-term regional plan for waste management, and for the monitoring of the effects of each waste disposal program.

The inadequate response by governments to the SCAR panel's survey points out the need to increase the amount and kind of information being collected by ATCPs on the activities of their national Antarctic programs. Such information should be included in the exchanges of information called for by the Antarctic Treaty. Future inspection teams should include observers with the professional background to gather data on waste disposal procedures currently being employed, as well as to make on-site judgments on the environmental effects.

The following recommendations were put forward by ASOC two years ago as a preliminary framework for developing a comprehensive waste management policy for the Antarctic:

1. The existing Code of Conduct should be fully adopted in the appropriate way by all member states of the Antarctic Treaty that were not ATCPs when it was originally adopted.
2. Every Treaty member should, if it has not already done so, enact binding waste handling and disposal regulations that are consistent with or stronger than the Code of Conduct and applicable Agreed Measures, covering all aspects of its program, and also take steps to ensure that the necessary equipment and procedures are in place to assure compliance.
3. A new Code of Conduct should be adopted by the ATCPs, based on input from biological scientists and logisticians in national programs, SCAR, IUCN and other interested organizations, that addresses all current waste disposal issues. The new Code should include performance and monitoring criteria, a commitment to regularly keep each other informed about impacts of particular practices, and an obligation to progressively refine the Code in the light of new information and technology. It should be given a more binding quality, as a new Agreed Measure.
4. Ocean disposal, incineration and burial of plastics, in whatever form, should be banned within the Antarctic Treaty Area and the CCAMLR Area, as an Agreed Measure under the Treaty and as a conservation measure under the CCAMLR.
5. To the maximum extent possible, the initial generation of "waste materials" should be minimized. This can be accomplished only if each national Antarctic program adopts this as a policy, and then takes firm steps to systematically review and reconsider what is taken to Antarctica, how it is packaged, and how it may be used again either in its program or some other Antarctic program.
6. To the maximum extent possible, materials should be re-used or recycled (in Antarctica where possible, or in the country of origin). This would include the re-using of packing boxes and crates, fuel drums, machinery (either given/sold to other countries in the area, or returned to the country of origin), and the recycling of glass, metals, paper products, chemicals, etc.
7. To the maximum extent possible, all waste products should be retrograded to the country of origin, or to another country if that is more logical and cost effective, and disposed of by appropriate methods. All stations should use efficient trash compactors, to ease removal. Although the removal of wastes will be more expensive than local disposal, particularly in the short

run, this cost must be regarded as the price of operating in the Antarctic, given the goal of providing maximum protection to its pristine environment. Logic dictates that this option is technically feasible, as all material that is brought down to the Antarctic leaves empty ship or plane space on the return trip that could be filled with waste materials.

8. Every base should establish a regular program of monitoring all effluents and point sources of water and air pollution, to establish a record of what actually is going on. This data should be related to regular scientific monitoring of various ecosystem indicators, including measurements of air and water quality and of contamination of various organisms in the region surrounding the facility.
9. Where bases or facilities are in close proximity, a cooperative approach should be employed to make best use of each facility's equipment and logistics capabilities, bearing in mind the timing of vessels and aircraft.
10. There should be agreement at an ATCM on a general program of cleaning up Antarctica. Given that some portion of the accumulated wastes of the past thirty years can be removed, an Antarctic clean-up may initially require the dedication of additional ships specifically for that purpose.
11. Based on recent studies, we do not favor use of incinerators in the Antarctic. As it stands now, no country is safely incinerating wastes. In any event, new technologies to incinerate wastes should be tested and perfected in the home country, not in the Antarctic. All incineration facilities that are installed should include monitoring equipment to measure precisely what contaminants are being produced and released to the environment, through whatever means.
12. State of the art technology should be employed to ensure that sewage discharge does not cause adverse environmental impacts, with the caveat that the treatment process should not cause more problems than it solves. The possibility of using sewage as a source of energy for stations should be studied.
13. Because most stations use fuel oil to generate electric power, as well as for both land and air vehicles, small physical barriers should be constructed to impede the spread of leaks into the surrounding areas and nearby bodies of water. No stations appear to have taken this step, or the more extensive measure of building large protective berms around their fuel tanks, to protect the local environment against the possibility of a massive oil leak.

C. Discussion of the Proposed Revised Code

The proposed new Code is superior to the old Code in its move to encourage the retrograding of waste. In addition to the removal of batteries, plastics, rubber, and radioactive waste accepted in the existing Code, the new Code suggests the removal of all wastes from the Treaty area, either outright, or by implication, in 9 recommendations.

However, some of these Recommendations are unclear or confusing in their intent and should be clarified to ensure that wastes are removed from the Antarctic and disposed of in the country of origin. For example, Recommendation 9 and 10 do not specify where old drums, once removed, should be disposed of. The strength of some Recommendations (2b, 4, 10, 14, 18, 19, 22, 23, 26, 27 and 28) is considerably weakened by such qualifiers as "wherever practical". Since it is quite clear that the new Code is comprised of Recommendations rather than outright regulations, so why must they be partially vitiated by qualifying "weasel words"?

In addition, some of the Recommendations implicitly downplay retrogradation by suggestions about incineration, which we submit is not an acceptable form of waste disposal in the Antarctic. With current technology and operating practices, incineration introduces unnecessary particulate and toxic emissions into the air.

The new Code has important new provisions calling on operators to limit the amount of waste generated (Recommendation 1), and to avoid sending harmful materials such as pesticides, PCBs and PVC (Recommendation 8). Although this is more comprehensive than the existing Code, which requests operators to limit the use of plastic packaging in the Antarctic, these new Recommendations have not incorporated within them the suggestion in the existing Code to avoid the use of leaded fuels or fuels containing ethylene bromide and ethylene chloride.

We recommend the following changes to the proposed new Code of Conduct:

Number 4: In the development of their waste management plans, National Antarctic Operators should [delete "where appropriate"] take into account their respective national environmental standards. Where national environmental standards are higher than those recommended in this Code of Conduct, those national standards should apply.

Number 8: National Antarctic Operators should not send to the Antarctic pesticides, polychlorinated biphenyls (PCBs), non-sterile soil or polystyrene beads, chips or similar forms of packaging. Additionally, they should discourage the use of polyvinyl chloride (PVC) products in packaging and should advise their expeditions of PVC products being provided. [Add "The use of leaded fuels or fuels containing ethylene bromide and ethylene

chloride should be avoided."]

Number 10: National Antarctic Operators should establish a long-term program to remove [add "from the Treaty area for return to the country of origin"] existing abandoned fuel drums [Delete "where such removal is practicable"]; where the transport equipment which delivered the drums is no longer available in the same area, the drum sites should be recorded for clean-up at the first opportunity.

Number 12: National Antarctic Operators should incorporate on-board waste compaction and storage [delete "incineration"] facilities in the design and construction of ships.

Number 14: [Delete "Where practicable"] National Antarctic Operators should clean-up their waste disposal sites and their abandoned work sites.

Number 15: The following should be removed or else [delete "incinerated"] autoclaved or otherwise treated to be made sterile:

Number 16: This recommendation should be deleted entirely, and replaced with: "To the maximum extent possible, all waste products should be retrograded to the country of origin or to another country if that is more logical, cost effective and agreeable to that country, and disposed of by locally appropriate methods."

Number 17: All plastics [add "and rubber, polyurethane and polystyrene foam, radioactive materials, batteries, and wastes containing high levels of heavy metals or harmful, persistent compounds"] should be removed from the Antarctic Treaty Area.

Number 19: This recommendation should be deleted as its useful provisions fall under the new recommendation 17 above.

Number 20: Waste to be [delete "burnt or"] removed should be stored in such a way as to prevent it being dispersed by wind or scavengers.

Number 22: Sewage and [delete "where practicable"] domestic liquid wastes should not be disposed of onto ice-free land but may be disposed direct to the ocean, [delete "preferably"] where conditions exist for rapid dispersal, [delete "with large quantities (from, say, over 30 people)"] first receiving at least primary treatment, such as maceration. It may be advantageous to treat very large quantities through Rotating Biological Compactor Systems, or the equivalent, to reduce BOD and suspended solids. [Add "National operators should investigate the feasibility of installing humus toilets at all stations."]

Number 23: [Add "Wastes should not be buried at coastal stations. Liquid wastes other than sewage and domestic liquid wastes"] [delete "solid non-combustible waste, PVC, polyurethane

foam and polystyrene foam" as they are included in other recommendations] should be removed from the Antarctic Treaty Area.

Number 24: Delete this recommendation as it has been incorporated into Recommendation 17, above.

Number 27: [Delete "Wherever practicable"] Wastes generated at field camps should be removed to their supporting stations, bases or ships for [delete "proper disposal"] subsequent removal from the Antarctic Treaty Area.

Number 28: This should be rephrased to ban all dumping of shipboard waste should be dumped within the Treaty Area.

Number 29: Delete this recommendation. None of the above recommendations need compete with safety aspects of operating in the Antarctic.

Number 30: The preceding recommendations should be followed by any non-government [add "or non-Treaty"] operator in the Antarctic.

In addition to the above recommended changes to the proposed new Code of Conduct, we suggest that the following additional recommendations be adopted:

1. SCAR should be requested to conduct an energy study of existing and projected levels of energy use for the next ten years, and an analysis of how alternative energies could be employed, bearing in mind the benefits of possible reductions in air pollution, number of containers devoted to transporting oil, and waste to be disposed of. This study should consider the interrelationships of waste and energy using a time frame of at least 25 years. Energy conservation should be a priority at all Antarctic stations.

2. Every Treaty member should, if it has not already done so, enact binding regulations that are consistent with the Code of Conduct and applicable Agreed Measures, covering all aspects of its program, and take steps to ensure that the necessary equipment and procedures are in place.

3. Because most stations use fuel oil to generate electric power, as well as for both land and air vehicles, stations should be required to erect small physical barriers to impede the spread of leaks into the surrounding areas and nearby bodies of water. For larger facilities, large protective berms around their fuel tanks, to protect the local environment against the possibility of a massive oil leak.

VII. Improvements in the Antarctic Treaty System

Never before has the public been so alarmed and angered by the diminishing ozone layer, dwindling marine mammal populations, and the threat of mineral exploitation of the fragile and near pristine Antarctic ecosystem. Now, as we enter the final decade of the millennium, is the time for the Antarctic Treaty nations to show themselves as global leaders by initiating the actions needed to lay a foundation for the future of this planet.

NGOs who attended the Preparatory meeting for this year's ATCM urged the government delegations to focus their attention on:

- o The need for an Antarctic Conservation Convention
- o Improvements in the System of Protected Areas
- o Implementation and improvement of EIA procedures
- o Improvement of waste disposal practices
- o Limiting the number of bases and regulating tourism
- o Participation of observers
- o Accidents such as the Bahia Paraiso and a system of liability
- o Enforcement of Recommendations

Once again, ASOC and Greenpeace applied for observer status to the ATCM. Both organisations have demonstrated a strong commitment to and considerable expertise in Antarctic matters. Those applications were summarily rejected.

Timely approval of Treaty recommendations by ATCPs continues to be a stumbling block to effective enforcement within the Antarctic Treaty System. Recommendations, although adopted by delegates at the ATCMs, do not actually enter into force until approved domestically by all ATCPs present at the ATCM. At the 1987 XIV ATCM it was pointed out that none of the Recommendations of the XI, XII, and XIII ATCMs are in force and that only three countries, New Zealand, South Africa and U.S.A, had approved all Recommendations to date. While this discussion has resulted in a rush of national ratifications, the situation remains essentially the same two years later. None of the recommendations adopted since ATCM XI are in force, essentially rendering meaningless eight years of deliberations. Poland alone holds hostage enforcement of the recommendations from ATCMs XI and XII.

It has been suggested that nations may intentionally delay ratification procedures as a means to avoid having to comply with certain recommendations. However, it is not certain that non-approval necessarily translates into non-compliance. In practice, many Treaty nations treat Recommendations as in force from their first acceptance at the Consultative Meeting. Perhaps more importantly however, approval does not automatically mean compliance. Indeed, numerous violations of the Agreed Measures and the Code of Conduct have been documented at stations belonging to nations that are prompt recommendation-approvers, most notably the United States.

Approval procedures for recommendations generally do not require legislative action. Why then, one may ask, does a Recommendation take so long to be approved at the national level, which means that the majority of recommendations do not become legally binding on the national level, even though they are approved? When domestic legislation is required to implement a Treaty Recommendation, there is no guarantee that the enacted law will accurately reflect the intent of the original Recommendation. To further complicate things, ratification processes vary markedly from country to country, making for different interpretations of each nation's legal responsibility.

Clearly, the current approval practice has been unsatisfactory as a mechanism of enforcement and must be re-examined. However, if consensus approval is to remain the criterion for entry into force, at the very minimum steps must be taken to standardize and expedite the process. Delegates at the Rio meeting spent considerable time exploring this problem, yet no formal decision was reached. In light of the fact that the Soviet Union, the United States and the German Democratic Republic are the only states to have approved Rio's recommendations, the subject requires further discussion.

Among the actions that Congress should consider, as part of its oversight role, are the following:

1. Congress should pass a resolution supporting the Australian initiative to negotiate a Comprehensive Environmental Protection Convention, which directs the State Department, EPA and other interested agencies to actively consider how to structure that negotiation.
2. The Congress should pass legislation that outlines a set of reform initiatives for the Antarctic Treaty System. Those initiatives, which include the creation of an Antarctic Environmental Protection Agency, an Infractions Committee and a Secretariat, should be taken forward by the Assistant Secretary of State for OES in collaboration with the Administrators of the EPA and NOAA and other members of the Antarctic Policy Group. Other initiatives should require the U.S. to take the lead in
 - a. developing a long-term Conservation Strategy for the Antarctic, in cooperation with the IUCN and other environmental organizations,
 - b. developing a soft energy strategy, using wind, solar, biogas and other options, and
 - c. proposing an Agreed Measure to replace Code of Conduct for Waste Disposal that contains the toughest possible standards and mechanisms for enforcement.

These initiatives should be presented initially at the

Antarctic Treaty Consultative Meeting in Paris to be held in October 1989, and should be carried forward in the international community by the Secretary of State and other senior officials according to a longer term plan of implementation. Because the Antarctic Treaty makes decision by consensus, it can be expected that this process will take a number of years.

3. The Coast Guard, which is the lead agency representing the U.S. at the International Maritime Organization, in collaboration with the State Department and other relevant agencies should seek to have the IMO declare the oceans around Antarctica a "special area", pursuant to MARPOL 1873/78, Annexes 1,2 and 5. U.S. agencies should take the lead in formulating rules for shipping that are consistent with such a designation.
4. The State Department should prepare an initiative on general principles of liability for the Antarctic Treaty Area that covers all types of accidents and incidents, such as the recent oil spill resulting from an Argentine vessel running aground.
5. The U.S. should help develop an implementation process for the new Environmental Assessment rules for the ATS, so that there is an international approach to their content, the process by which they are carried out and evaluated.

A. The Question of Environmental Assessments

The steadily increasing establishment of bases with associated logistic and scientific activity on the Antarctic continent, and subsequent concentration of human presence in some particularly accessible (and highly vulnerable) regions, highlights the urgent need for regular assessment and monitoring of the environmental impact of such activities.

A proposal for environmental assessment presented at the XII ATCM and referred to SCAR resulted in the publication of a SCAR report, "Man's Impact on the Antarctic Environment". Based on this, the issue was discussed again at the XIII ATCM in 1985. No decision could be reached, however, and the issue was again referred to SCAR. A Recommendation (Recommendation XIV-2) was finally accepted at the 1987 XIV ATCM.

Recommendation XIV-2 requires that national Antarctic organisations evaluate potential environmental impacts in planning Antarctic scientific research programs and associated logistics in accordance with a set of guidelines outlined in the Recommendation. These guidelines call for the preparation of a 'Comprehensive Environmental Evaluation' (CEE), if deemed necessary by an 'Initial Environmental Evaluation' (IEE). It must include

- o a description of the environmental state in the absence of

the proposed activity,

- o consideration of possible indirect or second order effects and cumulative impacts in the light of existing and other known activities,
- o identification of unavoidable impacts, identification of measures that could be taken to minimize or mitigate impacts and to detect possible unforeseen effects, and
- o the promotion of the implementation of comparable environmental impact assessment procedures.

Although Recommendation XIV-2 does not provide for broad circulation or comment it does allow for other 'concerned Antarctic Treaty Parties' to be informed and given the opportunity to comment, and encourages the development of reciprocal procedures for such information exchange and comment. But what does this mean in actual practice? A brief look at the major projects which occurred over the last couple of years shows that only one CEE was done and distributed to all ATCPs: the proposal for an airstrip at Rothera Point. While NGOs have some problems with the content of this CEE, we congratulate the UK for having made one, for having it circulated, and for having sought public comment.

What environmental evaluation was undertaken for other recent major projects? NGOs have tried to review their status, but have been unable to find out a great deal about recent or planned projects.

Projects we have learned about--1987/88:

The Republic of Korea established a year-round station in the 1987/88 season. Although it showed some planning with regard to waste disposal, it became clear to the visiting Greenpeace team that the final site was chosen for geographic and logistic reasons rather than on any environmental assessment. Construction of the Indian station at Maitree also began in this season and the the airstrip at Teniente Marsh was expanded, using some materials quarried from Ardley Island. NGOs are unaware of any environmental assessment associated with either of these projects.

While we understand that Recommendation XIV-2 was not accepted at the time these activities were planned, the spirit of the Recommendation might be met with the circulation of a document explaining the purpose of the activity, the reason for site selection and expected environmental impacts. Such a document would also aid the planning of any future activities proposed in the same area.

Projects we have learned about--1988/89:

The U.S. prepared an Environmental Assessment (EA) (which in

Antarctic Treaty terminology would be an IEE) for the McMurdo Science Centre. It was not circulated as there is no requirement to circulate IEEs. Presumably this assessment determined that there was no need for a Comprehensive Environmental Evaluation.

Sweden, which established an automatic weather station in 1987/88 and built a second station in 1988/89 is understood to have made some kind of assessment for at least one of these, but would not make any document available to a Swedish NGO.

Finland is rumored to have established a base this 1988/89 season, but no public information is available to confirm this, let alone to confirm whether an IEE or CEE were prepared. Peru established a base on King George Island this past season - while a description of the plans were made available, it concentrated on geographical and engineering reasons for choosing the site; no discussion on the environmental impact was included.

Italy and Germany expanded their existing bases in the Ross Sea Area this summer. The FRG carried out an assessment during the construction, not beforehand and no assessment of the Italian construction is known of. China established a station in the Larsman hills, but no CEE was distributed and if an IEE was made, NGOs are not aware of it. Finally, India finished the construction of its new station, without, as far as we are aware, an IEE or CEE being done.

We understand that the Recommendation is not binding as yet, and that in many of the countries involved there is no domestic equivalent to Environmental Assessments. However, we cannot agree with the fact that the Treaty system as a whole is not taking a more encouraging stance towards the environmental assessment process. Have the countries with such assessment experience, for instance UK, Australia, New Zealand, U.S.A and Norway, offered to make their experience available to the less experienced countries, in the spirit of international co-operation? Why not? An effective and immediate implementation of the assessment process can and should be obtained by drawing on the collective experience of the Treaty nations.

Many Treaty Parties with existing domestic experience committed themselves to provide CEEs, where appropriate, for their own activities, even prior to the approval of the Recommendation. Countries that made the commitment to provide IEEs and CEEs should do so, in order to provide an example and encouragement to the system as a whole. For example, we would like to see the U.S. finally prepare the Environmental Assessment for its ongoing programme, as a necessary step towards fulfilling its commitment and bringing its program in line with environmental requirements.

One major concern is lack of a clear mechanism for public input or comment on environmental assessments. Public participation assists in the production of a high quality evaluation. There can be no justification for the continuing

absence of public information and participation--unless the Treaty System has things to hide.

Another problem with the current Recommendation is that it is difficult for individual Treaty Parties that did not receive a CEE for a particular project to establish whether no CEE was made, whether one was made and not circulated (that is, it was deemed not to be relevant to any other Treaty Party), or whether one was circulated but not to that particular country. Likewise, the fact that there is no requirement to circulate IEEs means that it is almost impossible to routinely establish whether they were made or not. There is an obvious need for routine notification of IEEs made. A further step should be a tightening of the existing requirements: IEEs should be circulated as well as CEEs; they should be circulated to ALL parties rather than the ones that are deemed "interested" by the proponent of the activity. If environmentally unsound practices are permitted, the world community will put the responsibility for this on the whole Treaty System - each Treaty State therefore is an "interested party". We would submit that the public is an interested party too!

The Treaty System cannot sit back and assume that the environmental assessment process will automatically become standard practice. In order to ensure timely and effective implementation of this process it must actively encourage environmental assessments to take place and to be improved. The XV ATCM must take the opportunity to review the current situation, with regard to environmental assessments, to identify any difficulties already being experienced and immediately seek to remedy these difficulties.

As a minimum, countries that have experience with Environmental Impact Assessment procedures should actively share this experience with those countries for whom environmental assessment is a relatively new concept, in the spirit of international co-operation.

B. An Environmental Standing Committee?

A growing concern about environmental protection has resulted in ATCM agendas being increasingly stacked with environmental issues. At the last two ATCMs, more than half of the delegates' time was devoted to such items. A working group focusing entirely on environmental agenda items first met in Brussels 1985, and again in Rio in 1987. Although the convening of the Working Group was useful, substantive discussion was hampered by the lack of appropriate expertise on some delegations. Little progress was made in developing specific policy recommendations.

The Antarctic Treaty System will increasingly require substantive deliberation of environmental management issues. We submit that it would greatly facilitate the work of the Antarctic

Treaty System if an Environmental Standing Committee was established to deliberate on environmental matters and provide immediate advice during the Consultative Meeting. Such a committee should include SCAR representatives. Because SCAR is outside the AT discussions, it has at times needed to seek clarification on the advice being sought, further delaying the discussion. We envisage that the committee would meet during the ATCMs, and that it would be composed of appropriate experts from each delegation. The Committee would also invite relevant experts from international and non-governmental organisations to assist it in its deliberations.

The existence of such a committee could help avoid important decisions being deferred until the advice of SCAR or other government experts can be consulted. Delays of two years or longer are the norm of ATS decision-making. This is not to suggest that the advice of SCAR would no longer be sought or required. We would expect SCAR to continue to be involved in initiating and/or developing proposals. But an Environmental Standing Committee would facilitate better utilisation of SCAR by ensuring that clear advice is sought, and allowing the Parties to more easily understand and assess the advice received.

Streamlining the process of environmental decision-making is only one of the advantages of establishing such a committee. Another important benefit would be the sharing of information and experience about procedures required under the various Recommendations which have been approved. For example, those countries which lack domestic EIA legislation could benefit from the assistance provided by the group of experts.

C. Tourism

Since there are indications of a considerable change in the nature and scale of commercial tourism, and since the number of non-commercial tourists--especially off-duty personnel--is increasing, the need for a comprehensive management strategy becomes quite obvious."

Looking to the future, regulations on tourist activities in the entire region are needed. Such a system should incorporate enforcement provisions, provide for the coordination of tourist activities with other human activities, establish agreed environmental assessment procedures, create a system for monitoring of impacts, and set up liability provisions within the Antarctic treaty institutional framework."

D. An Antarctic Environmental Protection Agency

ASOC has proposed the creation of an Antarctic Environmental Protection Agency as one way to address the question of regulating activities in the region. It could be part of the new institutional arrangements created by a comprehensive

environmental protection convention. This can scarcely be said to be a radical idea, given the size and importance of the region and the experiences of so many countries with similar institutional arrangements.

The primary functions of an AEPA would be to:

- o undertake investigations and conduct assessments of proposed activities,
- o prepare environmental regulations for all allowed activities,
- o conduct inspections and monitoring operations,
- o report on compliance with rules and regulations directly to Antarctic Treaty members, observers and appropriate international bodies.

VII. Year of the Antarctic Environment

We urge that the U.S. and other members of the Antarctic Treaty System make the 1990-1991 austral year the "Year of the Antarctic Environment" and dedicate their efforts to focus on the many urgent environmental issues currently confronting the Treaty Area.

That year could function as a public forum in which to address those issues of interest to the global community. It could serve among other things to:

- o foster public debate and understanding, thereby addressing public fears that have been significantly heightened by the Bahia Paraiso and Exxon Valdez accidents;
- o prompt nations to: (1) clean up their scientific bases, (2) implement the Code of Conduct regarding waste disposal while adopting the SCAR Recommendations, (3) survey their areas of operation for the purpose of nominating new protected areas, and (4) review their operations with respect to their environmental impact and initiate or update Environmental Evaluations as needed;
- o educate citizens regarding the phenomenon of global warming, including how it relates to personal and national energy use;
- o publicly honor the Treaty Area as a Special Conservation Area.



ANTARCTIC AND SOUTHERN OCEAN COALITION

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November 17, 1989

MEMORANDUM

TO: Senators Hollings, Gore and Kerry
FM: James N. Barnes
RE: Your Follow-Up Questions on Antarctic Issues

I. Senator Hollings Follow-Up Questions for Mr. Barnes

1. Here in the U.S., federal lands are placed into a number of different categories and afforded different levels of protection from human activity. Mining and oil production are allowed on most federal land. National forests are more regulated, but logging and ranching are allowed. National parks are much more protected, and in wilderness areas there are no landfills, no roads, no motorized vehicles -- just a few backpackers.

-- What level of protection would you deem appropriate for Antarctica?

Answer:

Environmental organizations sometimes talk about our ultimate objective as being a World Park, a Science Preserve, or a Nature Reserve. These are designations that must be given specific content in order to be fully understood. We have outlined that content in a series of Information Papers. The two most pertinent, which are enclosed, are: "Permanent Protection for Antarctica: A Conservation Convention Is Urgently Needed" [Antarctic and Southern Ocean Coalition, PREP ATCM XV/INF. 2, May 11, 1989] and "The World Park Option for Antarctica: Background for a Fourth U.N. Debate" [Greenpeace International, Nov. 17, 1986].

We want to see Antarctica protected to the maximum extent possible consistent with allowing good science to be done. This means taking logical steps to minimize the impacts and risks of human activities.

Antarctica would best be protected by negotiating a framework agreement on environmental protection. Under such an agreement, a multiple-use zoning system could be developed including the designation of areas equivalent to national parks, wildlife

refuges, scenic areas, and wilderness areas. This framework of environmental protection would be used to set up institutions and procedures for ensuring adequate monitoring and enforcement.

Members of the Antarctic and Southern Ocean Coalition (ASOC) oppose allowing any minerals activities in the Antarctic, and favor achieving that through some form of permanent ban or moratorium agreed on within the context of the Antarctic Treaty System. Thus, we support the Australian proposal for such a ban.

-- What would be required to enforce such measures?

Answer:

Obviously, the Antarctic Treaty System is evolving, both in its awareness of environmental protection needs and how to tailor institutions and mechanisms to achieve compliance. Expanded use of the system of inspection allowed under the Antarctic Treaty, led primarily by the U.S., following an environmental checklist, will help.

As discussed in my testimony, there is not an effective regulatory system operating in the Antarctic at present. Instead, member governments to the Treaty agree on many vaguely worded recommendations that sound good, leaving it up to each individual country to determine for itself what the words mean and how to comply. In addition, most member countries have not involved the agencies of government normally entrusted with the responsibility of protecting the environment. At the bases of a number of countries the military retains a big role, partly because of the existence of territorial claims and partly for logistics reasons. This has been a negative factor in achieving compliance with many recommendations.

ASOC supports the proposal made by Australia and France for negotiation of a comprehensive environmental protection convention, which would establish the cooperative institutional mechanisms needed to assure compliance. These include some sort of inspection or surveillance corps, regulations stated in a binding, obligatory way, and mechanisms for evaluating alleged infractions. One idea that ASOC has supported is creation of an Antarctic Environmental Protection Agency. A briefing paper on this subject is enclosed.

Another aspect of the situation that should not be ignored is resources. In the U.S. for example, only after significant public pressure did the NSF ask for some of the funds necessary to clean up our bases. Inspections are expensive to carry out, and most nations have not budgeted the necessary funds. At the bureaucratic level, very few countries have even a single high-level person assigned solely to Antarctica. Compare this to the number of high-ranking officials assigned to arms or economic issues. Until the member countries accord Antarctica a higher priority in their allocation of time and resources, dramatic improvements will not be achieved.

2. Could you provide a summary of the results of the Paris meeting of the Antarctic Treaty Nations? In particular, (a) how have the prospects for the Antarctic Minerals Convention changed in light of the Paris meeting? (b) What are the prospects for negotiation of comprehensive measures for the protection of the Antarctic environment? (c) Was progress made on the other environmental protection provisions on the agenda?

Answer:

(a) The Consultative Meeting did not deal formally with the question of the Minerals Convention, although that subject was intensely discussed in many small groups. The results of the meeting do nothing to promote CRAMRA, and to the extent that the Australian-French proposal for a complete ban remains fully on the table, CRAMRA may be seen as having been set back a bit. There will be a meeting in 1990 to discuss the Liability Protocol and other minerals issues, but given the Australian-French position, it is unlikely that anything substantive will emerge. The drama of CRAMRA must be played out country by country as parliaments and legislatures decide what to do about ratification and also how to respond to the Australian-French proposal.

(b) There will be a Special Consultative Meeting on Comprehensive Environmental Measures in 1990. The terms of reference are broad, so that they preserve a full range of options for discussion at the Special Meeting, including the Australian-French proposal for an Environmental Protection Convention.

The prospects for successful negotiation of a Comprehensive Environmental Protection Convention are unclear, given the opposition of certain key countries, such as the United States. But more countries appear to be interested in the idea, particularly if many provisions already negotiated in CRAMRA can be utilized.

There also are other proposals for comprehensive measures on the table. These are discussed in the international newspaper, "ECO", published at the Consultative Meeting by ASOC, which is attached to this statement. Given the agreement to hold a special meeting in Chile next year on this question, I would say the prospects for significant progress are quite high. It is premature to say which approach will find broadest support among the governments. Here, the U.S. is a major factor. If we continue to oppose the negotiation of an Environmental Protection Convention, it is possible there could be a stalemate. On the other hand, if we support it, other key countries are likely to come along with us.

ASOC members urge the U.S. to follow the approach laid out in the Gore Resolution (S.J.Res.206), and provide leadership in taking the Australian-French proposal forward. We should be using diplomatic channels to support that initiative rather than trying to defeat it.

(c) Some progress on specific environmental items was achieved. In part this is a result of the greatly increased public interest in what was happening at the meeting, which facilitated consensus being reached.

The delegates are to be congratulated for taking some positive steps forward on a number of the substantive issues discussed at this meeting. These include:

Waste Disposal

A new Waste Disposal Code of Conduct strengthens the SCAR recommendation in a number of significant ways. Some provisions have been made more definite, and to this extent more legally binding. Although far from perfect, this Code will reduce environmental problems, assuming compliance. The ease with which consensus was reached on the new Code probably reflects the relative weakness of the SCAR proposal. ASOC hopes that further progress can be made during the next two years. We remain convinced that the basic objective should be to remove all waste from this very special place.

The governments' promise to ensure compliance by all those subject to their jurisdiction, including both private operators and government agencies, is welcome. We await with interest concrete solutions of how this commitment will be given effect.

One important subject not fully addressed by the new Code is how to minimize air pollution from energy generation. Most stations get energy from diesel generators, which degrade the atmosphere and jeopardise scientific research possibilities. ASOC urges every government to set up task forces with a mandate to develop new energy conservation plans for the next decade. The focus should be on non-polluting, renewable energy sources to the greatest extent practicable.

An extensive program of future work has been outlined by the ATCPs. We are pleased to see this clear acknowledgment that the new Code is not the last word on the subject. Among the important areas that it is agreed need further attention are incineration, dumping of wastes at sea, development of waste classification systems to minimise disposal problems, ship-board equipment, protective walls around oil storage tanks, and monitoring. The international environmental community looks forward to continuing its work with governments on this extensive agenda.

Environmental Monitoring

This Recommendation urges governments to do more monitoring of environmental parameters and the impacts of human activities, but contains no substantive obligations. Presumably SCAR will be coming up with substantial new recommendations during the next two years. Monitoring is critical for compliance with many

important environmental responsibilities. ASOC urges every government to put together working groups on monitoring, to come up with longer term programs that will provide the information necessary to make rational decisions.

Global Change

ASOC applauds this Declaration, which encourages all nations to sign the Vienna and Montreal accords on ozone depletion, and urges "the Parties to the Vienna and Montreal Conventions to step up their efforts to eradicate the causes giving rise to the depletion of the ozone layer".

The ATCP commitment to support the establishment of an appropriate atmospheric ozone observation and watch network in Antarctica is most welcome. They are asking SCAR to consider an International Antarctic Ozone Year, which would assist in making substantial progress in our understanding of the ozone hole phenomenon, as well as the impact on people working in the Antarctic and on Antarctic ecosystems. The preparation of a list of priority items for scientific work of global significance will help governments design cooperative research on the most important topics.

ASOC urges that the governments faithfully put these good words into practice. For example, they should greatly increase their financial support for the International Geosphere-Biosphere Program in the Antarctic.

Marine Pollution

It is unprecedented for an ATCM to discuss and agree on a new Recommendation in one meeting. We congratulate the governments for taking steps toward putting into effect in the Antarctic all the existing international marine pollution conventions. If the ATCPS, working in conjunction with the International Maritime Organization, agree to protect the Southern Ocean as a Special Area, for example, this would be a positive example of the ATS joining its efforts with other international bodies.

ASOC is concerned, however, about the broad caveat allowing governments to exempt their vessels from compliance with MARPOL. Given that most vessels are owned or operated by governments, this is a major loophole. We urge that every government commit itself to fully complying with the new Recommendation, and to disavow any use of the exemption for its vessels.

Environmental Impact Assessment

All member governments have acknowledged the need for further work on this important subject. It is encouraging to note that many delegations believe that environmental impact assessment procedures should be extended to cover all activities, including the decommissioning of facilities.

Among the important issues still to be dealt with are (1) when an Initial Environmental Evaluation (IEE) is required, (2) how to ensure that timely notification is given to other governments when a draft Comprehensive Environmental Evaluation (CEE) is done, (3) how to ensure that comments by other governments on IEEs and CEEs are taken into account, and (4) how CEEs will be used to make decisions. The fact that these questions have yet to be answered reflects in part the absence of environmental protection specialists at ATCMs.

ASOC welcomes the commitment of governments to share their individual experiences with environmental impact assessment procedures. This should help to develop a body of practical expertise and comparable practice. We hope that this will result in Ministries of the Environment becoming much more involved in Antarctic issues.

Importantly, the Parties agree that monitoring is an integral part of environmental impact assessment and that monitoring requirements should be incorporated into national environmental impact assessment procedures. ASOC is heartened by this acknowledgment and looks forward to seeing effective plans developed during the next two years.

The U.S. needs to do much more in this area to demonstrate its understanding of and commitment to the environmental assessment obligation. CEQ and EPA should be given special responsibilities to ensure that domestic practice with EIAs is utilized in the Antarctic context.

Protected Areas

A new single-purpose category, Specially Reserved Areas (SRAs), has been established, which will protect other values than presently are covered by Specially Protected Areas. These could include areas of outstanding geological, glaciological, geomorphological, wilderness and scenic values. Although they must be kept to the minimum number and size necessary to ensure protection of important examples of these values, this is a timely extension of the protected area system.

Multiple-Use Planning Areas

An additional new category of "multiple-use planning areas" (MPAs) was agreed to, the purpose of which is to preserve environmental values by furthering cooperation on operational activities. The cooperative planning and coordination of human activities will help minimize the cumulative impacts of bases and logistics facilities. At previous meetings, as this concept was developed, it had been called an Antarctic Protected Area and a Managed Area. The new words clarify some difficulties in translation, but their implication is not so expansive as ASOC once had hoped for. ASOC is pleased to see agreement on this new category, and expects the nomination and approval of specific examples at the next ATCM. We understand that three such

examples (Vestfold Hills, Signy Island, and Palmer Station) have been circulated to delegates. Much remains to be worked out regarding how this tool actually will be used.

Tourism

This is a perennial topic and not much ever happens. This time it is being referred to the Special Consultative Meeting on Environmental Protection, although tourist activities have more than environmental implications. Consider the question of safety, for example. Had the Bahia Paraiso sunk fifty miles from shore, would there likely have been extensive casualties?

Ice

The meeting was unable to clearly commit itself to refrain from the commercial exploitation of Antarctic ice despite the lack of any urgent interest in this activity. Curiously, SCAR is being asked to provide advice on the feasibility potential impacts of iceberg exploitation, a job it doesn't want and is unequipped to deal with.

II. Senator Gore Follow-Up Questions for Mr. Barnes

1. The Antarctic Treaty System contains a broad range of environmental protection measures. Yet enforcement of those measures varies since each nation is responsible for enforcing them on their own nationals. Some nations devote more resources and effort to enforcement than others.

-- In your testimony you complain about the way NSF enforces the Antarctic Treaty provisions on environmental protection. How would you improve the situation?

Answer:

This is a complicated question. NGOs have outlined their views in a number of publications that were attached to my testimony. The first thing to be done is to have a clear understanding of what the rules are. This requires agreement on which domestic and international laws and treaty obligations apply, how they should be interpreted and applied, and who is in charge of enforcement. Until very recently none of these conditions had been met.

Although the NSF has taken some steps to "review" which laws apply, NGOs disagree with the NSF's conclusions, and are urging Congress to make very clear which laws apply.

The NSF has a number of specific legal obligations yet to fulfill regarding promulgation of regulations under the Antarctic Conservation Act. NSF has violated the old Code of Conduct in several respects (by operating a landfill, and disposing of plastics and other hazardous materials in the Antarctic).

We submit that issues of compliance with and enforcement of environmental and safety regulations in the Antarctic should be dealt with by an inter-agency team, drawing on the best expertise of relevant agencies. For example, the EPA has several divisions that address some of the basic activities in Antarctica. The Coast Guard has a special Marine Environmental Protection unit, which has been involved in negotiating the MARPOL, SOLAS and other treaties about the marine environment and safety at sea.

2. How seriously are other nations taking the Australian proposal for a ban on mining in Antarctica? Are other nations re-evaluating their positions? Which ones?

Answer:

Some ATCP countries are taking the Australian proposal very seriously. For example, Italy and Belgium have signaled, through parliamentary resolutions and legislation, their support. Personal discussions with most delegations in Paris leads me to believe there is widespread support for the concept, but so long as the U.S. is firmly opposed, nothing ultimately can be achieved. I believe that many nations are in the process of re-evaluating their positions. These include India, China, FRG, USSR, Chile, Argentina, Uruguay, Spain, and Sweden. Even New Zealand, which led the negotiation of CRAMRA, apparently favors a permanent ban if it is negotiable.

-- In light of these developments, how likely do you think it is that the Convention will be approved?

Answer:

I believe it is unlikely that CRAMRA ever will be ratified by the requisite number and composition of countries, and hence that it will never come into force.

3. The Bahia Paraiso oil spill has brought up some thorny foreign policy issues.

-- What lessons do you think we should learn from the Bahia Paraiso spill?

Answer:

First, we must acknowledge that even small spills of oil, fuel oil and other substances can cause extensive harm to the environment, to wildlife, and to scientific research. Second, we must acknowledge that the proliferation of vessels operating in the Antarctic without proper regulation as to standards of construction, equipment, crew training, etc. is a formula for more accidents to happen. Third, we must admit that our practices for cooperatively producing good charts are inadequate. Fourth, we must acknowledge that there is no agreed stockpiling of equipment and trained personnel for dealing with such

accidents. Fifth, we must acknowledge that the Antarctic Treaty does not provide a system of liability and compensation to deal with such accidents. Sixth, we should take a careful look at what sorts of vessels are appropriate for tourists: this was a mixed use vessel that carried both fuel oil for Argentine bases and tourists.

III. Senator Kerry Follow-Up Questions for Mr. Barnes

1. The Antarctic Treaty System includes the Convention on Conservation of Antarctic Marine Living Resources, to protect fish, seals, whales, and marine organisms. It has been in effect for over six years now.

The U.S. research program for supporting CCAMLR is run by NOAA and has been severely underfunded. NOAA has less than \$2 million to monitor the entire Antarctic marine ecosystem. That's an embarrassingly small amount compared to the Soviets, the Japanese, and the Germans who are spending two to three times as much. Without investing in the research we can't assess the impact of fishing and other human activity in Antarctica.

-- What key questions are being left unanswered?

Answer:

In terms of meeting the objectives of CCAMLR, the U.S. Program has lost its capability to support the research outlined in the 1986 Program Plan, which is designed to implement the scientific and management objectives of CCAMLR. The presence of fishing fleets has already contributed to the overexploitation of Antarctic fish stocks and whale populations. Populations of blue, sei, fin, and humpback whales have been estimated as low as 1 percent of their former abundance levels. The recovery of depleted whale stocks is dependent in part on the continued availability of krill in the rich Southern Ocean feeding grounds. Several countries also fish for krill. Excessive fishing effort in local areas could have an adverse impact on local populations of krill-dependent species.

Two fundamental areas of research are needed:

- 1) evaluation and monitoring of stocks that are being fished or are potentially harvestable.
- 2) evaluation and monitoring of predator populations.

A major issue is the lack of information on the standing-stock and productivity of krill, the "keystone" species of the Antarctic marine ecosystem. It is not clear how much of an annual biomass of krill is required to support the dependent marine mammal, fish, and bird populations and the growing commercial fisheries for krill now at an annual level of approximately 500,000 tons. Significant controversy exists among scientists regarding a key question, how much krill is there?

Since the technical problems inhibiting the rapid expansion of the krill industry have been overcome, it is now more critical than ever that the U.S. maintain an active program for assessing krill abundance and demonstrate the scientific leadership necessary to meet the objectives of CCAMLR. Of current primary importance is determining how to estimate the distribution and abundance of krill.

The U.S. program, under present budget restrictions and vessel availability, is unable to conduct appropriate fish and krill surveys to monitor levels of krill supporting dependent marine mammal and bird populations. Lacking our own data, the U.S. is now dependent on information from other countries, and has lost its leadership in the implementation of the fisheries convention's important "ecosystem as a whole" principle.

The accuracy of data provided by other countries is often questionable because most research is based on catch statistics from fisheries vessels. It is necessary for scientific surveys and research to be carried out independently of the fishing activity to estimate stock sizes and distribution. Otherwise, there is a danger of false assessment and inappropriate management, which in the worst cases, may lead to severe depletion of stocks that goes undetected.

Accurate assessments of depleted finfish stocks are needed in order to determine their condition, or rates of recovery, if any, based on conservation measures enacted over the past three years. Basic research must be done to answer a key question, whether fish stocks are recovering or do they remain in a depleted state? The CCAMLR system is in dire need of information on which to decide the conservation measures, if any, that are necessary for protecting the ecosystem, for maintaining the long-term viability of the fisheries and for meeting the objectives of the Convention. Little of this type of research is being done.

In relation to the assessment and monitoring of predators, there are a number of gaps in the current research effort that desperately need filling. An inventory of seal and bird colonies around Antarctica, especially in relation to krill concentrations, is required for understanding the potential impact of krill harvesting in the krill "hot spots" in the Southern Ocean. More importantly, surveys of whales in this region are mostly incomplete and need refining. A key question for CCAMLR is, whether krill harvesting affects the well-being of krill predators?

Also, more research is required on the potential or actual impacts of global change, warming and ozone depletion on the lower end of the Antarctic food chain, including phytoplankton and zooplankton. These are among a number of issues that the CCAMLR Commission, and Congress, need to address when assessing the potential and real impacts of harvesting.

-- How much money would be needed to answer them?

Answer:

The minimal amount required to support a program of applied research in support of CCAMLR is the present equivalent of \$4,200,000 as outlined in the Program Plan prepared in 1986 by the Department of Commerce under the requirement of PL 98-623.

An important problem arises from the fact that funding is only provided one year at a time (i.e., it is not a line item in the Department of Commerce/NOAA budget). The consequences of limiting allocation to an annual renewal has been that the U.S. is unable to commit itself to long-term research that is required to monitor predator populations and target stocks necessary for the successful operation of the CCAMLR Ecosystem Monitoring Program. Similarly, we are not able to take part in multi-national research programs that benefit CCAMLR while saving costs for participating members. Most importantly, we are unable to take the lead in proposing long-term, multi-national research needed to effectively meet the CCAMLR objectives.

Funding at present does not allow vessels, or aircraft, to be chartered to put research teams in the field when the NOAA vessel that is being used to support the US AMLR program cannot be used for that purpose. For example, the NOAA vessel does not have the capacity to conduct fishing trawl surveys to assess the stocks of exploited fish species and to verify the reliability of catch and effort data being provided by the Soviet Union and other fishing nations. Funding needs to be extended to allow the U.S. to pursue these research programs.

Currently, the U.S. lacks adequate capability to evaluate other nations' stock assessments and other research, which means we cannot play a leadership role at CCAMLR meetings or maintain our influence within the Treaty. Additional funds should be provided for this purpose.

2. The Australians and others have called for a comprehensive conservation convention to provide greater protection for the Antarctic environment. Discussion of such a convention will be on the agenda at the Paris meeting of the Antarctic Treaty nations next month.

-- What kind of Convention would you envision?

Answer:

As spelled out in the Information Paper attached to my testimony, the Convention would have principles applying to all activities, procedures for evaluating the potential environmental impacts of those activities, and institutions for carrying out regulatory and enforcement activities.

-- Is it possible to adopt the Mineral Convention and then later adopt a more extensive, stricter Conservation Convention?

Answer:

Although this is conceptually possible, it is politically impossible given that two key countries have decided to oppose the Minerals Convention. ASOC is totally opposed to this approach. Leaving aside the flaws in CRAMRA, we believe that if minerals activities begin to be allowed, it will be virtually impossible to stop them later through another legal instrument. Bear in mind, that if CRAMRA were to enter into force, notifications about commercial prospecting could be made on day one, and prospecting would begin nine months later.

-- How long would it take to negotiate a Conservation Convention?

Answer:

Truthfully, no one knows. That would depend on the desire of countries to reach accommodations. It could be accomplished quite rapidly if that reflected the will of all member countries, and if it were agreed to include significant portions of CRAMRA, modified slightly to deal with the broader range of activities.

Senator GORE. Thank you very much.

Well, we have a number of questions to explore here. Even though we will be looking in great detail this fall at the minerals convention, I think I would like to start with a few questions on the convention.

You state, Mr. Barnes, and you state, Ms. Kimball, that in the environmental community there is unanimous agreement that there should be no mining in Antarctica.

Do you agree with that, Mr. Scully?

Mr. SCULLY. I do not believe that we are in a position to make an *a priori* judgment that mining should never take place in Antarctica. The reason, in fact, that the convention was negotiated was that there is no international consensus, nor is there a consensus within the United States, that one should forever at this stage make a decision to ban the possibility of mineral resource activities in Antarctica.

The issue of a ban was discussed in some detail prior to the initiation of the negotiations, and there was simply no agreement upon it. Neither internationally, nor in the United States. We are not a single issue society.

At the same time, in my personal view, I do not see the possibility of mineral resource activities and mining activities taking place in a way that could be environmentally sound in the near future on the basis of existing techniques or technologies.

Now whether or not at some point in the future the technologies, the techniques, the economic need would be such to permit mining activities to take place in a way that would be acceptable in light of the very strong environmental concerns we have for that area remains to be seen. Our view is that, we cannot exclude the possibility that mining could take place in an environmentally sound fashion. We cannot make an *a priori* decision on that basis for all time.

Senator GORE. So in your opinion, the administration's position with regard to the Australian initiative would be in opposition to that idea?

Mr. SCULLY. Yes, it is. I think President Bush made that very clear to Prime Minister Hawke during the recent visits and exchanges of correspondence.

Senator GORE. The opposition is based on the view that it is premature to decide that we do not want to see mining in Antarctica?

Mr. SCULLY. That is in part our view.

I think the view is a somewhat broader one in the sense that we believe from an environmental perspective that the convention offers the best opportunity to ensure that decisions about possible activities, possible mineral resource activities, will be made in a way that will emphasize and ensure that very strict environmental standards are taken into account. Under the convention, mining activities would be prohibited unless there is a consensus that they could take place in a manner which is environmentally sound.

In my view, an artificial and inaccurate opposition has been drawn between environmental protection and the mineral resource convention. Specifically it is argued that there is a choice between the Antarctic Mineral Resource Convention with the destruction of Antarctica environmentally; and a permanent ban which will pre-

serve Antarctica and retain its wilderness values forever. This is an artificial distinction.

If there is to be a permanent ban there will need to be consensus among the parties of the Antarctica Treaty to achieve such agreement. This is one of the basic difficulties we have with the Australian view. That consensus simply does not exist.

If the agreement was in force already there would be a ban on any mining activities which could only be lifted by consensus.

Senator GORE. Under which agreement?

Mr. SCULLY. Under the minerals agreement, under the Wellington Convention.

If that agreement were in force, no mining activity could take place until that same consensus existed. A number of governments had a very difficult time accepting that provision on consensus, including the United States, for precedential as well as for other reasons.

However, we are prepared to accept a prohibition on mining if the parties to the agreement looked at the question of possible mining activities, at such time as such activities might be proposed and were unable to agree at that time that it is more environmentally acceptable for those activities to go forward. We would be prepared to accept that.

We think that the procedures as well as the standards in the agreement are adequate to ensure that there would be a valid basis for making those decisions in the future.

What caused us difficulties and what causes us difficulty with a permanent ban is that, it rest on *a priori* judgment that activities should never be considered regardless of the circumstances and regardless of the facts in the future.

That is where our difficulty lies, and I do not think that posing the issue as one of agreement versus environmental protection is an accurate characterization of the agreement itself.

Senator GORE. So the convention is a compromise between those who feel that at some point in the future mining might in some circumstances be advisable, albeit it with environmental protections, and a second group who feels that mining should be prohibited and that this convention is the most practical way to prevent mining from taking place because it sets up such rigid criteria and such high hurdles for nations to clear that mining would become unlikely in the aftermath of its ratification.

Is that a fair summary, Ms. Kimball, of the compromises the convention embodies?

Ms. KIMBALL. Yes. I think I would add one element to that, and that is there does not seem to be much interest in going ahead with minerals exploration and development at this time. We have not even found the likely minerals. The issue of prospecting is a different issue, and there is interest in going ahead with the prospecting.

Now my view is I would rather have the Minerals Convention in place as a regulatory mechanism. The minute it is clear that, say, Australia or France or one of these countries is not going to ratify that convention, then this sort of voluntary ban, so to speak, on minerals activities is off.

At that point, prospecting could go ahead. I would rather have prospecting go ahead under the controls laid out in the existing minerals treaty. That is one of the reasons that I favor it.

The other point I would like to make is I am not sure that there is an absolute opposition between the ban and a treaty. I think the minerals treaty should be in place, so that even if a ban is agreed to, the treaty is the fallback if ever the ban no longer remains in force. I do not deny that there could be a ban on exploration and development activities for an agreed point in time. I wonder with Mr. Scully if we can get that ban, if there would be consensus on it. The minute there is no consensus, you have no ban. Moreover, a ban is very subject to political decisions from one election to the next. It is very subject to pressure if somebody finds a major find down there. If Japan went down and found oil tomorrow, I think there might be interest in trying to make a deal with one of the countries, say Australia, so that it could be developed.

I think that pressure is going to force, if not unilateral minerals development, at least a renegotiation or another agreement which, in my view, will come out far less good than this one did on environmental protection.

Senator GORE. Now the opposition to the ratification of the convention is based on the view that the political conditions which existed at the start of these long negotiations have changed radically. Increased awareness of global climate change and the fragility of the world's environment has led to a sea change in public attitudes around the world and has increased the likelihood that sovereign nations might be willing to go much farther than the carefully constructed compromise embodied in this convention.

Because this possibility either exists or seems to be emerging, it would be a mistake to ratify a convention which would hold out the possibility at a future time of mining in the world's most fragile environment.

Is that a fair statement of the other side, Mr. Barnes?

Mr. BARNES. Yes, sir, I think that is a fair statement. There are a couple of other aspects to it that might be worth mentioning.

The first is that if the Minerals Convention is brought into force, it will from the beginning day after it is in force allow prospecting to go forward. In reality, there will be very few controls about the prospecting.

I think the fear among environmental groups and obviously some governments is that that leads us down a path that takes us inexorably to that day when a government or a company or both says we want to get a mining permit down here.

I have heard that our government has said this, in fact, to some people involved in this debate. If a member to this treaty system were to take the view that they would always vote no against any commercial licensing opportunity, that would be an exercise of bad faith in terms of this agreement.

Senator GORE. That is Prime Minister Hawke's view.

Mr. BARNES. Yes.

The bottom line, I think, for the environmental groups I represent and for some of these governments is is this the right path to be walking down and does it take us in the right direction.

I have asked lots of companies myself this question over the last couple of years. Would you care if Antarctica was put off limits, and the answer always is no.

The second question is if it is not off limits, will you go down and compete to find resources and try to get the licenses and so forth, and the answer to that question is yes.

I think that really is kind of the crystallized feeling that lies underneath all of these developments that we are seeing in the last six or eight months.

Senator GORE. Mr. Scully, where is all the pressure coming from for keeping the door open for mining? Who is so adamant as to prevent the possibility of a consensus on a more protective regime?

Mr. SCULLY. I think, again, Mr. Chairman, I would not agree with your characterization. The question of a what is protective regime is really a question of what governments will decide at some point in the future.

Senator GORE. That is right, but you said earlier that in your opinion it would be impossible to reach a consensus in support of the Australian initiative.

Mr. SCULLY. I agree with that.

Senator GORE. Because there is a view held by some that it is premature to make such a sweeping decision, and that is in any event the wrong way to go about it. They say that one should look at each potential mining possibility on its own terms and look at the value of the activity and measure it against the risk of damage to the environment, the feasibility of mitigating measures, et cetera, et cetera.

That leads me to believe that somebody is very interested in keeping that possibility open. Where is that pressure coming from?

Mr. SCULLY. I think a number of the parties are interested in keeping the possibility open in the sense of not excluding them. I mean, if you are asking is there pressure for mineral and resource activity in Antarctica, are there companies waiting to invest, the answer is no, at least as far as I know in the United States.

Senator GORE. What about elsewhere?

Mr. SCULLY. I would say my guess is the same, although my knowledge is not as detailed.

Senator GORE. Is there some Japanese activity?

Mr. SCULLY. There is Japanese interest, but again the interest at this stage is simply in obtaining an indication of resource potential as would be the case, I think, for any frontier area.

Senator GORE. What about the explosions that are part of the exploration activity? Do you know to what I am referring?

Mr. SCULLY. The use of the geophysical remote sensing techniques?

Mr. BARNES. Geophysical prospecting.

Mr. SCULLY. Geophysical techniques using sonic means, boomers, et cetera, are practices and techniques that have been used in Antarctica for geological research. The difference, I think, between that and prospecting is the way in which the activity would be concentrated.

Senator GORE. Is that going on right now?

Mr. SCULLY. Yes, it is.

Senator GORE. Who is most active in conducting it?

Mr. SCULLY. Well, I am not sure. For the upcoming season I would imagine the FRG has a program of remote sensing work that is going on. The Brazilians have indicated an interest in doing so. The Japanese have undertaken such research. In the United States the U.S. Geological Survey has undertaken such research, although it is not doing so this upcoming season.

Senator GORE. Is activity of this kind useful in locating areas that might have hydrocarbon deposits?

Mr. SCULLY. It can be. The difficulty is that from the scientific point of view as I understand it, the effort to reconstruct the geological history of Antarctica, which is a scientific issue of interest in its own right, involves the use of techniques which will one way or another provide some information with regard to the possible mineral resource potential, particularly of offshore areas.

Senator GORE. I have the impression that the most active nations in this regard have been Japan and the FRG. Is that right or wrong?

Mr. SCULLY. I think that is probably right, certainly in recent years.

Senator GORE. Is that because of a disproportionate interest in pure scientific research on the part of the Japanese?

Mr. SCULLY. No. I think it is clear that with respect to a number of the governments involved that research is being supported by components of the government that do deal with mineral development.

Senator GORE. So it is fair to conclude that their activity is aimed in significant measure at discovering the potential for extracting hydrocarbon deposits from Antarctica, is it not?

Mr. SCULLY. At one level of generalization, yes, but I do not think that the kind of activity that is taking place has been constructed in the way that a commercial enterprise seeking to identify specific sites would do so.

Senator GORE. That is premature, but that is the objective.

Mr. SCULLY. I think, as in the case with most scientific research, there are a variety of objectives. That is clearly one of them. I would not say that is an exclusive objective.

Senator GORE. When you look at the level of activity by the Japanese as compared to most other nations, it is hard to conclude that the explanation for the difference is anything other than the interest in discovering extractable hydrocarbons.

Mr. SCULLY. I am not sure I can make that conclusion, Mr. Chairman.

Senator GORE. What do you think, Ms. Kimball, Mr. Barnes, Dr. Wilkniss?

Ms. KIMBALL. I do not think any of us can interpret the Japanese government policy to say what is behind it. I think that kind of activity could be interpreted in either way.

Senator GORE. Well, there has been an organizing principle behind many of their other activities.

Ms. KIMBALL. Well, I do not know what it is. I mean, if you would like me to say are they looking for oil? Sure, I would be happy to say that.

Senator GORE. Well, the organizing principle behind most of Japan's activities in the world has been economic self-interest.

Ms. KIMBALL. My inclination is to say you are right. I cannot sit here in judgment of Japan and say I know what they are doing.

Senator GORE. I mean, it is not the most suspenseful detective story I have ever encountered. I mean, it is not a big mystery.

Ms. KIMBALL. Well, I think you are probably right.

Mr. BARNES. Mr. Chairman, we have tried to investigate this through Japanese members of our coalition over the last couple of years and to have some interesting documents from MITI and other parts of the Japanese government industry interface you might call it, which I think shows unmistakably that they are very directed in their focus here, and they are looking for possible sources of hydrocarbon deposits.

Having said that, though, I do know some of the Japanese scientists personally, and I know that every individual scientist is not necessarily out looking for oil. They have a list of interest in a purely scientific way.

Senator GORE. I am sure, as Mr. Scully says, there are a variety of objectives, but the level of activity is clearly the result.

Mr. BARNES. But, this points up again one of our underlying fears about where this minerals conventions track will lead.

Japan, as a number of other countries in the treaty system have state oil companies where they have very close working relationships between government and oil companies and some countries have more money to spend on exotic endeavors than others do. Japan just happens to be one of them.

So, if suddenly the rules of the game are different and the main game is no longer scientific research which at least theoretically is supposed to be widely shared amongst the parties and instead becomes finding commercially interesting areas to possibly get a license over, I think that has a grave tendency to warp research in the Antarctic more toward this kind of activity, and it really does lead almost inevitably to a competition between some governments and some companies to find and exploit ultimately those deposits.

Senator GORE. Ms. Kimball.

Ms. KIMBALL. If I could just make one comment on that, I agree with Jim's last comment, and that is one of the reasons why I think it is going to be very difficult to get a ban on minerals activities and one of the reasons why I think it is better to have this convention in place.

Senator GORE. Well, Ms. Kimball, let me ask you a question I began to explore with Mr. Scully during his statement.

If Australia opposes the convention and instead—

Ms. KIMBALL. If Australia will not ratify it, it is dead. Australia can accede to this convention at any time, and I think some of us are unwilling to say that they have definitively taken the decision that they will never accede to it.

Senator GORE. Well, I had a personal conversation with Prime Minister Hawke when he visited Washington, it was at his initiative, and focussed primarily on this subject. One of the things Australia and the United States have in common is the same language and I, therefore, had some advantage in interpreting the meaning of his statements, and it was not difficult.

His views and those of his government are very clear. I do not know how one can find room in interpreting their statements for

alternative understandings. I mean, he said Australia is opposed to the convention, period. We will fight it, period. We will never ratify it, period.

What rays of hope do you find in those statements?

Ms. KIMBALL. Not many. However, I will go back to the point of the ban. The Australian position has two aspects to it. One is a ban on minerals activities, and one is trying to seek as an alternative a comprehensive convention on environmental protection in Antarctica that would incorporate that ban.

Now, nobody is objecting to the latter if you took out the ban. Nobody objects to the idea of comprehensive environmental protection measures in Antarctica. What form they take we can worry about later.

With respect to the ban, I do not think they are going to get it, so then you are left with what happens next. Now, if they say they are not going to ratify CRAMRA okay CRAMRA is dead. Then prospecting can go ahead with no controls. There is pressure to do something again. The pressure does not just stop. It does not just stop so that we can all say well, nothing happens from here on out now.

Another thing about the ban is Australia was a great supporter of this convention all during its negotiation. They reversed their position in May, and—

Senator GORE. When was the bi-election in Tasmania where the environmentalists demonstrated their clout?

Ms. KIMBALL. April, I think.

Senator GORE. Probably a coincidence.

Ms. KIMBALL. I do not think the political ban is a very durable instrument. I happen to think international law is a much stronger instrument, and that is why this ban is subject to the next election and is subject to a lot of change over time whereas if you have agreed rules in place as international law, they have got much greater durability.

Senator GORE. Mr. Scully.

Mr. SCULLY. I would like to agree with that point. The question of a ban is one that has been discussed a good bit, it might be useful to describe the basis of the current conditional ban. In the final act of the conference which adopted the convention in June of 1988, it was agreed by all of the parties, there was a consensus among all of those who negotiated the convention, that they would seek to ensure that no activities covered by the convention took place pending the timely entry into force of the agreement.

That extended a concept that the parties had agreed to during the course of the negotiations. In other words, they agreed from the start of the negotiations that, as long as the negotiations were proceeding and after the conclusion of the negotiations as long as progress was being made toward the implementation toward the result of those negotiations, they would seek to make sure that no commercial activities, that none of the activities covered by the agreement took place.

This ban or moratorium, as it is called, is clearly tied to the timely entry into force. To restate what Lee mentioned, if the Convention is dead, then, the moratorium is gone, the interim restraints.

Senator GORE. So, no one wants to accept what Australia seems to be saying as the final word on it.

Mr. SCULLY. Our view on the matter is that as we are very much interested in ensuring that there is a comprehensive set of measures to protect the Antarctic environment, our difference with those who seek a permanent ban is that we see the Antarctic minerals convention as an important element in that comprehensive set of measures.

There is, however, I think, a very large body of agreement among all of the parties on the kinds of needs and the kinds of elements that should go into such a comprehensive approach. The United States has made a number of major suggestions already in that regard.

I think what will happen, if you wish my prediction on the matter, is that we will work on a comprehensive approach, we will achieve a result, and at that later stage there will be an opportunity for all of the parties to take a look at how—

Senator GORE. For the Australians to reconsider?

Mr. SCULLY. For the Australians to reconsider, for everyone to take a look at the overall picture.

Senator GORE. What is the definition of "timely" in the context in which you used it before? How long?

Mr. SCULLY. We have intentionally stayed away from that.

Senator GORE. Until now.

Mr. SCULLY. Our basic approach at this stage is to recognize that consideration of the convention is going to be a complex process within all governments. We would now see the issue of what is timely posed in a positive sense. It would be posed in a negative sense if a party were to indicate without—in a way that would convince us that it intended to not ratify the agreement and to do so in a way that made it clear that the agreement could not enter into force.

We do not think we have reached that point. We believe that Australia and France, in particular, have been very careful not to make that point. As I understand the Australian position as conveyed to us, it is to oppose mining. We (Australia) seek a ban. We (Australia) are going to try to persuade you and all the other Consultative Parties of that point and, therefore, we have decided not to sign the convention.

As I understand, the future is left open.

Senator GORE. Well, there may be a difference between what the Prime Minister says and what the official government position is. I know certainly that there is a great deal of question about what the true French position is, some statements by individual representatives of that government to the contrary notwithstanding.

We need to move on, but go ahead, Mr. Barnes.

Mr. BARNES. Well, I just thought on this precise point it might be useful to read what the Australians actually said in their statement on May the 22nd. They said, "Pending the successful negotiation of the comprehensive environmental protection regime, Australia will make major efforts to strengthen and prolong the present moratorium on mining in Antarctica, the moratorium which at present applies until the timely entry into force of the minerals convention should be given a stronger basis to take account of growing international concern about the potential damage which could be caused by minerals activities."

And, as I understand it, they have nominated recently a high level international environmental emissary who is going around the world talking to governments about this question.

Senator GORE. Well, that is consistent with what Mr. Scully said, as I heard it. Well, anyway, if the convention is ratified, how likely is it that it would, in effect, prevent any mining, Mr. Scully?

Mr. SCULLY. I am not sure I am the best qualified to answer that question. I do not see any possibility of mining taking place in the near future.

We accepted the premise that if any government party to that convention in the future believed that it was unacceptable, we would accept that result if that government were prepared to say and to make the judgment on the basis of a standards of environmental protection contained in the agreement.

Therefore, I think that the likelihood of mineral resource activities in Antarctica on that basis in my view is quite slim, but I cannot say that it is a possibility that it would be excluded for all time.

Senator GORE. Did you want to comment on that, Mr. Barnes or Ms. Kimball?

Mr. BARNES. I would like to comment on it if I could.

I think obviously we do not know what individual governments may do down the road 10, 15, or 20 years if faced with this question, but we can acknowledge many other situations in international relationships where if a single country or small group of countries feels very strongly about something but there is a lot of other relationships that they have going on with other more powerful governments, they can be rolled or they can be induced to change their view about things.

So, even if an individual government or, say, two or three governments felt very strongly about a particular mining application, it does not make us, shall we say, really sanguine that they might be able to stand up to the influence of Japan or the United States or Germany supposing those three countries wanted to see these activities go forward.

Senator GORE. You might get some mutual back scratching, and all of a sudden one of the parties is free to go.

Mr. BARNES. That is right.

Senator GORE. Ms. Kimball.

Ms. KIMBALL. Well, I agree with Jim on that. I mean, I think that is something to worry about in the implementation of this regime. However, the fact that we have one state that can veto the opening of a particular area of Antarctica to minerals development is a guard against that. It is not an absolute guard, there's no question. I do not think there is such a thing as an absolute guard in international decision-making processes.

I think one of the factors of the convention that will help prevent that kind of activity is what I would refer to as the sunshine provisions, the openness with which business would normally be conducted. But, there are also—the convention is not perfect there. There is one group, one decision-making body that could well be more open, and I think we would like to work to see it more open in the implementation of the convention.

Do any of our other witnesses wish to comment on this particular subject?

Mr. BARNES. If I could just briefly, Senator. One thing that we identified in the Project Blueprint document, which the environmental community transferred to the administration in the Congress last fall, where some specific recommendations, which are on page 8 and 9 of my prepared statement. And they had to do with how our government, itself, at the present moment, organizes itself to conduct and fund research in the Antarctic.

We make a number of recommendations there to move to some extent away from merely responding to an individual research requests. For example, toward a system where we have priorities clearly defined and are articulating for ourselves as a society and a global player in this particular region, priorities for a directed research which include the various kinds of monitoring programs and so forth that are required to let us know what is happening in Antarctic from a global climate change standpoint and to plug that into the international framework.

And I will not read the recommendations here, but I think we all in the environmental community believe this would be a help, both in the United States, internally, and in the international arena.

Senator GORE. Yes. There is a lot of resistance to that in NSF, is there not, Dr. Wilkniss?

Dr. WILKNISS. I am very happy to report, Mr. Chairman, that that is changing. And let me give you some examples.

First of all, I agree fully with Mr. Barnes, that that is an area that in the past has been snubbed, so to speak.

The ozone hole was directed research. We did not have a program, and between NASA and ourselves spent \$30 million, and we directed—

Senator GORE. After the serendipitous discovery by the British.

Dr. WILKNISS. Yes, sir. I will not deny that a single researcher who did painstaking work for 30 years was the one who made the discovery.

Senator GORE. And all the raw satellite data was in the files with nobody really having ever looked at it in that context, is that unfair?

Dr. WILKNISS. That is very serious food for thought for multi-megabuck systems that are designed to observe what happens in the environment, I believe so.

But, we have been forced into that kind of thing. Look at the *Bahia Paraiso* incident, and somebody said, well, we have to do research on the impact. I am happy to report that we find outstanding academic researchers who are willing to do it, who see a lot of merit for their own research in it. We have no problem finding them and funding them.

The same is true for McMurdo. We have not had a chance yet to respond to the criticism on not monitoring. We have had scientists from our best universities last season, spend extensive time to survey the bottom communities, to do monitoring of hydrocarbons, PCB and heavy metals. And, again, some fine basic researchers participate, so I think the former stigma on monitoring is disappearing.

And when you talk about the environmental research, or the chemistry or the ozone hole, that was not taught when I went to school, and it should have been taught. It is now acquiring acceptance and is considered an exciting research field.

So from the NSF point of view, we have found good people who are willing to devote themselves to it and to bring in the young students, the next generation that will be able to understand all these complex interactions that we are looking at.

Senator GORE. All right. Mr. Scully, did you want to comment?

Mr. SCULLY. Just a very brief point on the question of Antarctica and global change.

We have sought to enforce the efforts of the U.S. polar science community within SCAR. We have suggested and succeeded in including on the agenda of the next consultative Meeting in October, an item on that subject.

It may be largely a consciousness-raising exercise, but we, the Treaty Parties have invited a number of the international bodies that are involved in the implementation of global-change studies, including climate change to be, to send observers. We would hope that, as a result of the meeting, the political need to integrate of polar into the global-change studies will be assisted.

Senator GORE. Very good. Let me say that we have reached the hour of noon and it has been a lengthy hearing. I will have some other questions for the record if the witnesses are willing to respond in writing.

I also want to say that, something that I did mention earlier, I will have a continuing interest in this, the subcommittee will, and we will have further hearings to provide oversight and to monitor the activities of NSF in protecting the environment where their activities take place. And we will have further discussions concerning the Convention or at least those parts of it that properly are the attention of this Committee.

And I will be looking forward to continuing conversations with all of these witnesses. And with that, let me thank each one of you for coming and spending so much time here today talking about these issues, and I look forward to continuing this dialogue in the future. Thank you.

[Whereupon, at 12:00 p.m. the hearing was adjourned.]

[The following information was subsequently received for the record:]

STATEMENT OF GREENPEACE

The following is the statement of Greenpeace USA to the Subcommittee on Science, Space and Technology of the United States Senate. This statement addresses the environmental aspects of the National Science Foundations' proposed Antarctic Safety, Environment and Health Initiative as well as the possible environmental implications of the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA). This statement should be incorporated into the Record of the Subcommittee's hearing held on September 8, 1989. Please note that James N. Barnes also has submitted a statement on environmental problems in the Antarctic on behalf of Greenpeace USA and other Antarctic and Southern Ocean Coalition (ASOC) member organizations.

"As we make our mark on more corners of the Earth, it is becoming ever more important to save what remains unspoiled. Even though most people will never have the opportunity of seeing for themselves the amazing ice formations, the vast penguin colonies or the awe-inspiring views of the mountains and glaciers of Antarctica, it is still a great consolation to know that somewhere on Earth there exists a whole continent that is an almost pristine wilderness. Constant vigilance is necessary to make sure that Antarctica remains as untouched as possible, for isolation has been poor defense against contamination from the world." (Sir Peter Scott, Greenpeace Book of Antarctica)

At the outset, Greenpeace would like to applaud the Subcommittee for recognizing the significance and magnitude of the environmental problems facing the Antarctic, and for holding this most timely hearing. The XV Antarctic Treaty Consultative Meeting will address these very issues next month in Paris. Moreover, the U.S. Senate will be considering ratification of the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA) in the near future.

Background

Greenpeace is an international environmental organization with over 1.2 million supporters in the United States. The organization has been active in Antarctic issues for seven years, campaigning to have the continent granted protective status as a World Park. Since the austral summer of 1985/86, Greenpeace has conducted annual expeditions to the Antarctic. During the 1986/87 season, we established a small, minimum-impact, year-round station on Ross Island. World Park Base is the only non-

governmental base on the continent. To date, Greenpeace expeditions and base teams have conducted environmental monitoring and documented waste disposal operations at 22 stations belonging to 16 nations. Dramatic direct actions and demonstrations have been performed to draw attention to the most urgent environmental abuses including destructive waste disposal practices at scientific stations.

Antarctica is this planet's last wilderness, home to rare species of plants and animals including penguins, seals, and whales. In its pristine state, Antarctica acts as a baseline against which science can monitor global pollution trends. Scientists now know that this continent plays a critical role in regulating global climate, and provides a unique laboratory to study such phenomena as stratospheric ozone depletion and the greenhouse effect. It is also believed that clues to the earth's origins are written in the Antarctic's great ice cap. These values are steadily being jeopardized by human interference on the continent. Station operations and poor waste disposal practices significantly alter and even destroy the fragile marine environment, as well as the fraction of ice-free land available to sustain the continent's wildlife. Assuredly, this singular wilderness and global laboratory is worthy of the highest level of environmental protection and must not be threatened further by irresponsible human activities.

Unfortunately, environmental protection has been long neglected by those nations operating in the Antarctic, including the US. Scientific stations are a leading source of pollution in the Antarctic. Greenpeace inspections have revealed that most scientific stations and support operations are seriously damaging the local environment, and do not meet environmental standards established under the Antarctic Treaty.

The National Science Foundation and the US Antarctic Program

Visits to US stations, Palmer and McMurdo, have confirmed that the US policy and practices for disposal of waste do not comply with key Treaty recommendations, including the Code of Conduct and the Agreed Measures for the Conservation of Antarctic Fauna and Flora. Both stations discharge raw sewage into the surrounding waters. McMurdo station operates a landfill and burns its combustible waste, including toxic materials, in open pits. Furthermore, mountains of scrap metal and defunct machinery, dating back to the program's earliest days, have been left behind by previous US operations. Some of this rubbish has been in the Antarctic for as much as thirty years, and has contributed heavily to the contamination of the local ecosystem. Indeed, it has become quite clear that a comprehensive cleanup of US Antarctic facilities, and an upgrade of waste disposal policy and technology must become a top priority for the US Antarctic Program (USAP). Greenpeace commends the National Science Foundation (NSF) for seeking the funding necessary to achieve these objectives, and supports the appropriation of the \$10 million special funding for FY 1990 for the Safety, Environment

and Health Initiative. However, Greenpeace fears that the Initiative, as is, will fall significantly short of adequately improving overall environmental standards within the USAP. (Initiative's shortcomings are addressed below.) In addition to special funding, Greenpeace urges the Congress to provide the oversight needed to guarantee that the implementation of this Initiative proceeds in the most expedient and thorough manner possible.

The NSF has repeatedly stated that it lacks the funding necessary to address the environmental impacts of its Antarctic operations, and that to do so would be at the expense of scientific research. Full funding of this new Initiative would do away with further tradeoffs between the environment and science, and afford the Foundation the budgetary flexibility to pursue both objectives. The successful implementation of a truly sound environmental Initiative and cleanup effort by the US would set an example for other Treaty nations to emulate.

While pleased with the Initiative's overall goal of improved environmental protection, Greenpeace has many reservations with respect to the details of the proposal. Greenpeace is most concerned with the undefined timetable for the overall Initiative, and the lack of clear priorities within the plan. Greenpeace feels that in order to carry out this Initiative, the NSF must design a 'master plan' detailing which projects are priorities and outlining implementation schedules for each project. Despite the NSF unveiling the Initiative on February 7, 1989, the Foundation has yet to make this essential information available. Without this information, the Initiative cannot be assessed accurately.

Regarding the Initiative's specific environmental recommendations, Greenpeace is concerned that the best waste disposal options have not been explored, and that some problem areas have been overlooked altogether. For example, the Fortress Rock landfill has not been addressed. Fortress Rock is a significant source of pollution at McMurdo, and must be included in the Initiative. Increased removal or retrograding of wastes from the Treaty area is not mentioned as a possible waste management option. Retrograding is by far the most environmentally desirable method of waste disposal, and must be a major component of any solid waste management scheme. The Initiative also recommends installing an incinerator at McMurdo despite recent reports in the US concluding that refuse incinerators are major sources of highly toxic chemicals such as dioxin and furans. Greenpeace cannot support the installation of incinerators at Antarctic bases. Concerning liquid waste, the Initiative only suggests maceration as treatment. Chemical analysis of McMurdo's sewage discharge identified significant amounts of heavy metals in the effluent. The NSF must commit to identifying and eliminating the source of this contamination, as well as developing an environmentally compatible treatment system equivalent to secondary treatment. Most importantly, Greenpeace would like to see the NSF firmly commit to developing a

comprehensive and rigorous monitoring program.

Poor enforcement of environmental provisions has continually plagued USAP operations. Greenpeace is pleased to see that the NSF has created the new position of Safety, Environmental and Health Officer (SEHO). The SEHO will coordinate the implementation of the Initiative, and oversee the enforcement of regulations and procedures dealing with waste disposal and the environment. There should now be clearer lines of accountability within the system. It would also be useful if the SEHO was required to report to the Congress on the Initiative's progress on an annual basis.

Greenpeace is also pleased that attention is being given to the reduction of plastics being introduced into the Antarctic, the placement of containment equipment around fuel tanks and depots, and the procurement of oil and fuel spill equipment.

Further information on this subject can be found in Greenpeace's submission to the Subcommittee on Science, Research and Technology of the US House of Representatives (April 1989), joint Greenpeace-Environmental Defense Fund testimony to the Subcommittee on the Veterans Administration, Housing and Urban Development, and Independent Agencies (May 5, 1989), Greenpeace comments on the NSF Office of General Counsel's draft report entitled "A National Science Foundation Strategy for Compliance with Environmental Law in Antarctica" (August 25, 1989), and Greenpeace comments on the NSF's Environmental Protection Agenda (October 7, 1988).

The Convention on Regulation of Antarctic Mineral Resource Activities

After seven years of intense negotiations, the Antarctic Treaty parties adopted the Convention on the Regulation of Antarctic Mineral Resource Activities on June 2, 1988. The CRAMRA establishes the legal framework under which mining and oil drilling in the Antarctic could occur. Recently a handful of key Antarctic Treaty Consultative Parties (ATCPs) have begun to express their doubts about the wisdom of this convention. Australia, France and Belgium have taken strong positions against the CRAMRA stating that the Antarctic deserves the highest possible environmental protection. France and Australia are advocating that the CRAMRA be replaced by a Comprehensive Environmental Protection Convention, and that the continent be designated an "international wilderness reserve", off-limits to minerals activities. Greenpeace wholly endorses this far-sighted proposal, and strongly urges the US and all ATCPs to do the same.

Proponents of the CRAMRA contend that the convention is actually an instrument of environmental protection, not a mining code. CRAMRA-supporters argue the convention will ensure that if resource activities are undertaken, these activities will be carried out in an 'environmentally sound' manner. Without the CRAMRA, they say, an unregulated scramble for resources will take

place. This argument is based on two erroneous assumptions: 1) that environmental protection and minerals development are compatible, and 2) that nations and private companies would risk mining in the Antarctic without a legal framework in place.

Clearly, the massive spill from the Exxon Valdez has illustrated that no convention nor degree of regulation can safeguard against human error. The US has some of the most stringent environmental regulations in the world, and a catastrophic spill occurred nonetheless. In addition, the Antarctic Treaty System (ATS) has a long history of poor enforcement. Non-compliance with Antarctic Treaty recommendations such as the Code of Conduct for Antarctic Stations and the Agreed Measures for the Protection of Antarctic Flora and Fauna is commonplace at research stations; France continues to construct a runway through penguin breeding grounds; several species of finfish remain in jeopardy despite the marine living resources convention's attempts at management; and many protected areas have never been marked. The same parties that look the other way in the face of these problems will be making key decisions about mining and the environment.

Not surprisingly, only when the ATS has explicitly banned specific activities has its efforts at enforcement been truly successful. The 1959 Antarctic Treaty essentially demilitarized and denuclearized an entire continent by banning military activities, the testing of conventional and nuclear weapons and the disposal of nuclear waste. These bans have proven very effective and durable for three decades, and have bolstered the Treaty's goal to reserve the continent for peaceful scientific endeavors. For these reasons, Greenpeace does not believe that anything short of a total ban on mineral activities will protect the environment.

The possibility of a resource free-for-all occurring if the CRAMRA does not enter into force is very unlikely. Without a legal framework in place, any attempt to pursue minerals would not be financially sound. An operator would be forced to make a substantial monetary investment with no guaranteed property rights if deposits of value are found. Furthermore, if governments thought they could exploit Antarctica's resources without a minerals agreement, they would never have agreed to enter into negotiations, and certainly would not have accepted the requirement that a decision to open an area to exploration be arrived at by consensus.

In addition, advocates of the agreement fail to acknowledge the potential negatives that could result from mining in Antarctica. Clearly the local environment will suffer. Mining is inherently destructive to the environment. Mining in the Antarctic also could have serious repercussions for the global environment. The continent plays a major role in regulating global climate and sea levels, and acts as a litmus test to measure global pollution. The degradation caused by routine mining operations could permanently compromise the value of the continent as a global laboratory and haven for science. Indeed, the Bahia Paraiso oil

spill destroyed years of research at the US's Palmer Station, including a critical project related to ozone depletion and the effects of increased UV light on phytoplankton. This project was the only one of its kind. The spill, 170,000 gallons of diesel fuel and lubricants, though significant in the pristine Antarctic, was small by industry standards. Further, the CRAMRA wrongly sends the signal that nations should continue to seek fossil fuel reserves. The burning of fossil fuels has been named a leading cause of the greenhouse effect.

Freedom of scientific investigation and international cooperation could be diminished greatly by prospecting alone. The ability to withhold potentially valuable information from other ATCPs, a provision granted under the CRAMRA, will clearly infringe upon the unique openness and cooperation that has flourished in Antarctica. Serious rivalry and conflicts over resources could even lead to the destabilization of the region. These are the exact values that the 1959 Antarctic Treaty sought to preserve, and threatening that foundation would be to the detriment of the world community.

